

U.S. ELECTRONIC COMMERCE/
EDI FEDERAL MARKETS
1991-1996

INPUT

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1991-1996

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**Federal Information Systems and Services
Program (FISSP)**

***U.S. Electronic Commerce/EDI Federal Markets,
1991-1996***

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Abstract

Federal government demand for electronic commerce products and services will increase from \$411 million in government fiscal year 1991 to \$649 million in 1996. The market will experience sustained growth at a compound annual growth rate of 10% through the five-year forecast period.

In the federal government, EDI is used to transfer electronic purchase orders, invoices, bills of lading, tax information, and financial reports. The government's need for increased productivity and effectiveness, along with continuing budgetary constraints, will drive federal agencies to use EDI.

The government is an extensive user of other forms of electronic commerce, including EFT (electronic funds transfer), CALS (an evolving standard to transmit procurement information), EBT (electronic benefits transfer), EDMICS (transfer of engineering drawings), SGML (document transfer), and various proprietary formats.

This report, *U.S. Electronic Commerce/EDI Federal Markets, 1991-1996*, discusses present and future agency procurements. Specific examples of EC opportunities for vendors are identified.

The report contains 193 pages and 54 exhibits.

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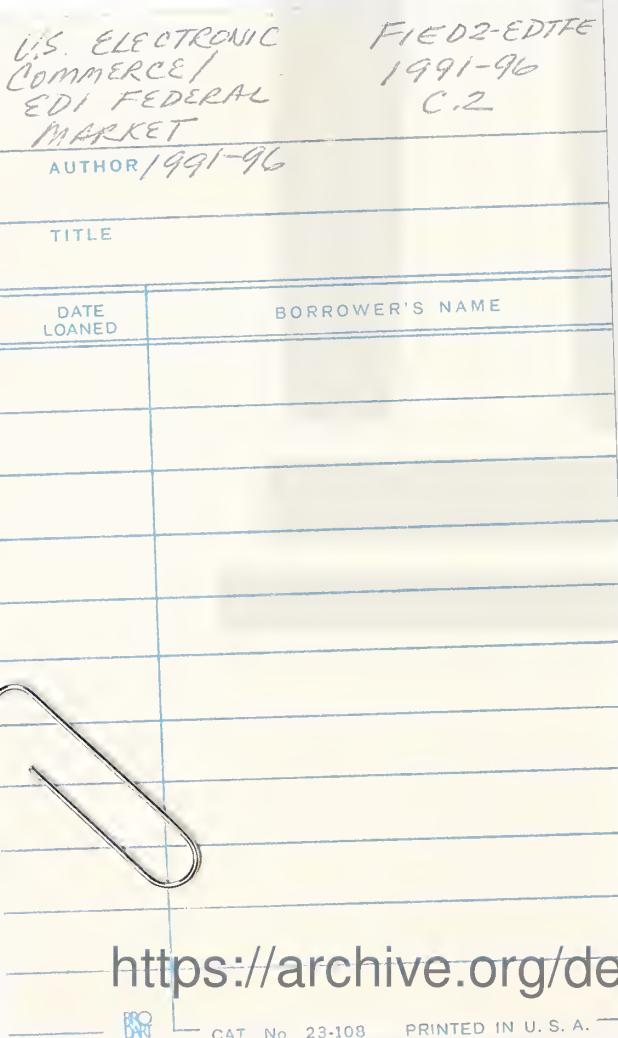


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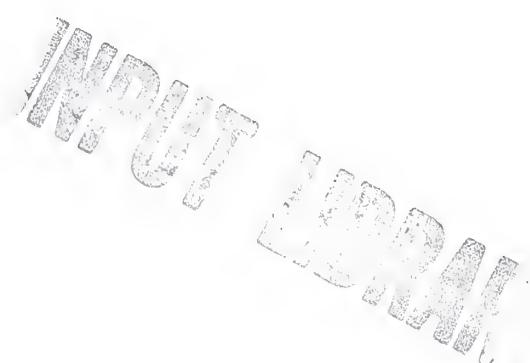
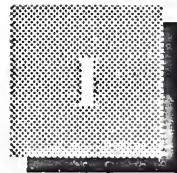
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Introduction

A

Background

This report, produced for INPUT's Federal Information Systems and Services Program (FISSP), examines the electronic commerce market in the federal government.

INPUT defines electronic commerce (EC) as the electronic transfer of information among organizations in a structured application. The organizations involved may have different computers, networks, terminal types, software, protocols and applications. The format may be a recognized U.S. (ANSI) or international (ISO) standard, an industry-specific standard, or a standard unique to the individual application.

Federal agencies, their suppliers and their recipients are establishing techniques and standards for electronically transferring data. These include a broad range of applications such as engineering drawings, aircraft flight plans, customs documents and welfare benefit transfer payments.

It is unlikely that government agencies will require all suppliers and recipients, especially smaller ones, to use electronic commerce. Electronic commerce can reduce some of the difficulty and competitive disadvantage in doing business with the federal bureaucracy for smaller businesses. Major defense and aerospace contracts now contain language that mandates the use of electronic commerce. For example, it is used to transfer and deliver in electronic format engineering drawings, specification changes, and maintenance manuals. Electronic commerce has substantial support from industry because it can reduce errors, control costs, expedite changes, and speed payments.

B**Scope**

For market analysis purposes, this study focuses on planned and operational electronic commerce systems being undertaken by federal agencies to support various electronic applications. These programs are primarily vendor-supported or custom-designed systems.

This study includes all structured electronic commerce in ANSI, ISO, MILSPEC, industry-specific or private formats. It excludes unstructured data or information transfer such as telex, fax, voice, video, electronic bulletin boards, electronic mail (E-mail) and direct transfer by media such as computer tapes, disks or CD ROM.

This report also serves to supplement INPUT's previous 1989 report on electronic data interchange in the federal government. It is intended to give INPUT's clients a clear description of the current status and future trends of the federal market.

C**Methodology**

The research for this report employed the following sources:

- The OMB/GSA/NBS Five-Year Plan analyses for INPUT's Federal Information Systems and Services Program (FISSP) Procurement Analysis Report were reviewed for programs to be initiated during the period of interest.
- The available agency Long-Range ADP Plans for GFY 1991-1995 and GFY 1992-1996 were researched for major electronic commerce programs and new electronic commerce system initiations.
- Questionnaires were developed for interviews of federal agency officials and electronic commerce vendor executives.
 - Agencies selected for interviews were identified in one or more of the above plans as proposing to contract with electronic commerce vendors. Agency officials contacted included information resource managers, contracting officers, and program managers.
 - Interviews were conducted with electronic commerce software vendors and developers, computer hardware vendors, VANs, and communications firms.

For comparative purposes, the questionnaires used similar questions about contracting policies and preferences, selection criteria, and vendor performance characteristics.

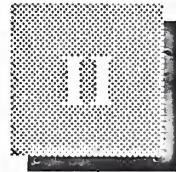
- The agency planning-level questionnaire was designed to obtain information on agency planning of proposed systems. It is included as Appendix B.
- The agency user-level questionnaire was designed to gain information about plans for expansion, as well as new systems and applications. It is included as Appendix C.
- The vendor questionnaire was designed to help understand industry status and future federal market plans. It is included as Appendix D.

D

Report Organization

In addition to the introduction and appendixes, this report consists of five chapters:

- Chapter II contains an executive overview describing the major points and findings in the report
- Chapter III provides the market forecast and describes the major market issues and trends impacting the industry
- Chapter IV summarizes federal agencies' requirements for EC systems and the application areas supported by existing and planned systems
- Chapter V presents vendors' perspectives on the federal EC market
- Chapter VI provides a sample of business opportunities for programs and initiatives involving EC in the federal market.



Executive Overview

A

Federal Market Pressures

The federal market for electronic commerce (EC) products and services is now maturing and is expected to continue to grow over the next five years. Some of the pressures driving this growth are listed in Exhibit II-1. Government programs require steady improvement in both the quality and quantity of information technology support.

EXHIBIT II-1

Federal Market Pressures

- Need for improved productivity
- Technical staff shortage
- Budget deficit
- Commercial expectations
- Mandated use

In its drive to improve productivity, to do more with less, the federal government is growing increasingly reliant on information technology. At the same time, functional and pricing trends, especially in microcomputers, workstations, networks, and associated software, have opened new opportunities in government for using technology.

Agencies continue a heavy commitment to maintain and enhance existing systems, as well as develop new systems. However, staff shortages and limited expertise effectively prevent in-house performance of these tasks. Further, pressure to reduce the federal budget deficit increases the importance of efficiency and innovation. EC offers a potential means of enhancing productivity.

While the budget deficit is constraining some programs, it is actually fueling the growth of EC. Most agency officials who understand EC recognize the potential gains in productivity. The first three factors listed in Exhibit II-1 combine to drive the federal EC market.

The fourth factor listed relates to stronger growth in the commercial EC market. Over the past few years, commercial EC activities, especially in banking and purchasing, have achieved relatively greater popularity than those in the federal government. As a result, the federal EC market trails the commercial market, and the gap is still growing. However, commercial expectations are encouraging growth in the federal market. Trading partners of federal agencies have seen the advantages of EC in the commercial market, and many are encouraging their federal customers to adopt EC techniques.

In order to expedite the achievement of these benefits, federal oversight agencies are mandating that electronic commerce be used by the government in general and in specific areas and programs. These directives detail which standards are to be used in specific applications.

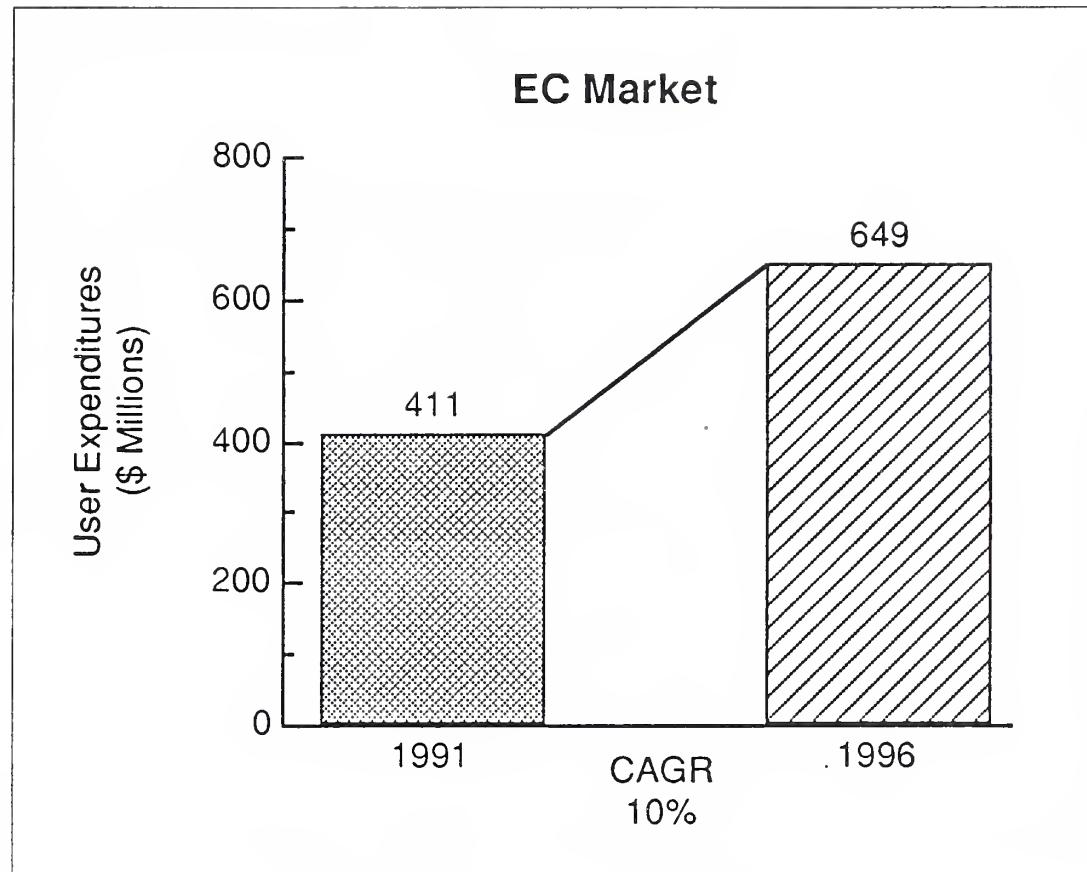
B

Market Forecast

INPUT estimates that the federal EC market for network services, software, professional services and equipment will increase from \$411 million in FY 1991 to \$649 million by FY 1996, a compound annual growth rate of 10%.

INPUT believes this to be a conservative market analysis and forecast. There are additional EC opportunities as part of other systems. This estimate is primarily based on currently identified programs. Also, because some of the programs are very large, they can have an individual impact. A single successful, large program could cause the market to increase. INPUT will reexamine this market in 1992.

EXHIBIT II-2

**C****Major Applications**

In the federal government, EC is used to transfer engineering drawings, tax information, procurement documents, and corporate financial reports. Plans are under way for EC use in transferring electronic purchase orders, invoices, bills of lading, and other documents. EC is also used with electronic funds transfers, health care insurance claims, electronic flight plans, electronic benefits transfer, electronic publishing, regulatory filings, and other applications. A limited number of mission-oriented applications are also used at such agencies as the Securities and Exchange Commission and Customs.

It is interesting to note that administrative messages are included among future applications. Administrative messages differ from other applications in that they involve intra-agency or agency-to-agency communications, as opposed to communication between agencies and contractors. INPUT expects these applications to become important and widespread as agencies begin to appreciate the value of EC in handling administrative traffic.

D**Reasons To Use EC**

Agencies are converting to EC for several reasons. The expected benefits ultimately translate to budget, staff, and mission impacts. Improved productivity of information exchange is achieved through less human intervention. Information is transferred in computerized form. The addition of electronic functions to existing on-line data systems improves the usefulness of those systems. The third reason was to replace paper documents in some applications. This conforms to the mandate to reduce paperwork and reduces the cost of data capture. EC has the ability to support the agencies' missions, resulting in fundamental levels of improved services. EC can also simply supplement existing paper document exchange.

Agencies use EC for these reasons. In implementing EC, many agency executives anticipate improved, more cost-effective mission performance. Exhibit II-3 summarizes these points.

EXHIBIT II-3**Reasons for Agencies to Use EC**

Reason	Rank*
Improve productivity of information exchange	1
Add electronic functions to existing on-line data systems	2
Replace paper documents for selected applications	3
Support agency's mission	4
Supplement paper document exchange	5

*Based on frequency of mention

E

Software Criteria

Because software is becoming a major factor in the federal EC market, INPUT asked agencies and vendors about software characteristics. Exhibit II-4 lists, based on frequency of mention, the most common responses.

Agencies cared most about the upgradability of the software, while vendors were more concerned about integrating EC software into large systems. In the previous survey, agencies ranked maintenance as number two. The drop to a ranking of 5 suggests that, while maintenance may still be important, it is no longer a major concern to federal agencies.

EXHIBIT II-4

Software Criteria Ranking

Characteristic	Ranking	
	Agency	Vendor
Easily Upgraded	1	3
Exception Reporting	2	4
Acknowledge Transmission	3	2
Easily Integrated	4	1
Maintenance Agreement	5	5

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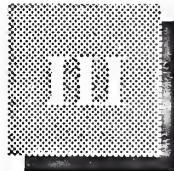
Leading Vendors

As the federal EC market matures, some vendors are beginning to take leading roles. Exhibit II-5 lists some of the more prominent vendors.

EXHIBIT II-5

Leading Vendors in the Federal EC Market

- GE Information Systems
- EDI, Inc.
- BDM
- Martin Marietta
- Xerox
- CSC



Market Analysis and Forecast

A

Market Evolution

1. Market Forces

The federal electronic commerce (EC) market is evolving from a series of pilot projects to numerous production systems. Most major systems are in the first phase of a multi-phased implementation. Further, a few major contract awards have occurred recently. Agencies are proceeding cautiously toward EC, largely with industry participation and prodding by oversight agencies.

Exhibit III-1 lists the market forces impacting the federal EC market. Budget constraints affect different agencies in opposite ways. In some cases, limited funds hinder EC exploration, while elsewhere, funding cuts are driving some agencies to EC as a viable cost-cutting solution.

EXHIBIT III-1

Market Forces

- Budget constraints
- Staff shortages
- Productivity improvement
- Management/oversight mandates
- Amended Paperwork Reduction Act

EC is also being employed to combat staff shortages at agencies and improve productivity. EC systems can eliminate some manual data re-entry operations and increase the speed and accuracy of data exchange.

The oversight agencies, such as OMB, have drafted policies that mandate use of EC throughout the government. The DoD has also released memoranda to mandate EC, as well as to define standards.

For purchase orders, invoices and payment processes, agencies are seeking to reduce the paperwork burden. The amended Paperwork Reduction Act encourages the use of EC as a means of reducing the paperwork burden on businesses. Together, these forces are encouraging a slow but steady maturation of the federal EC market.

2. Impact on Federal Suppliers

Nearly all agency respondents of two earlier INPUT surveys noted that EC systems have affected or will affect the federal suppliers that service their agencies. As shown in Exhibit III-2, improvements in response time and support by suppliers have exerted a dominant effect. Simplification of ordering and payments processing procedures has also occurred since the implementation of EC systems. Furthermore, government agencies hope that increased accountability for purchases and payments will simplify audit analyses. It is interesting to note that, except for some rearrangement of the items, the same five issues were mentioned most often by agency respondents in an earlier report.

EXHIBIT III-2

Agency Views of Impact of EC on Federal Suppliers

Factor	Rank*
Improvements in response time and support	1
Simplified ordering and payment processing	2
Increased accountability for funds and payments	3
Improved timeliness of data	4
Decrease in paperwork	5

*Rank based on frequency of mention by respondents.

In most cases (except for small firms) agencies noted an overall eagerness of suppliers to utilize EC. They also noted supplier satisfaction with the systems. Most federal suppliers in the shipping and transportation industry are already fully operational in EC processes. Agency respondents expect that federal suppliers will reduce their administrative costs as EC use develops throughout the government.

As federal EC pilots expand into full-fledged production systems, most large and medium-sized suppliers will feel the impact. They must eventually invest in EC technology. However, INPUT expects delays in this investment while the government refines its standards and presents a more uniform approach to industry.

Over the next five years, the government will require most medium-sized to large suppliers to support EC. The inevitable EC migration will also affect many small suppliers. Congressional hearings on electronic commerce concluded that it would not have a negative impact on small business. In fact, many participants expected a positive impact.

3. Impact of Commercial EC on Federal Market

Agencies understand the impact of developments in the commercial EC sector on the federal government's implementation of EC. Exhibit III-3 lists the most frequently mentioned effects.

EXHIBIT III-3

Agency Views of Impact of Commercial EC on Federal EC Market

Impact	Rank*
Facilitated implementation of translation software and VAN services	1
Promoted development of standards	2
Improved reliability of production services	3
Improved ease of use	4

*Based on frequency of mention

The most frequently cited influence has been that the commercial sector has already facilitated the implementation of translation software and VAN services, so government agencies do not have to reinvent any EC technology. The commercial sector has also promoted the development of standards. Many of the X.12 standards, such as purchase orders, invoices, and payment/remittance advice, are already being utilized, along with standard transaction sets.

At the military exchanges, EDI serves as an example of how one area of commercial EDI activity has brought about additional interest for government operations. Many of the retail suppliers to military commissaries were already users of EDI and the grocery standards previously established. Therefore, it was an easy and logical step for organizations such as the Army and Air Force Commissary Exchange Services to migrate to EDI for their purchase orders. The AAFES organization is going to test payment of invoices (EFT) as the next phase of implementation.

There is a project under way to combine the management, administration and purchasing of all Air Force, Army, Navy and Marine Corps exchanges. This would create a single entity with over \$10 billion in sales. These exchanges have hundreds of electronic trading partners, with the potential for thousands of partners due to the variety of products offered at the bases.

The military exchanges will become even more active in the future for EDI as additional transactions and standards are implemented. Suppliers to these commissaries view EDI as a necessity for doing business.

B

Market Structure

1. Market Components

The EC market can be examined as the sum of its components. These components include:

- Network services, including access point maintenance, error correction, protocol and speed conversions, switching, internetworking through gateways, directories, and store and forward services. These services are typically provided by value-added networks, although private networks may provide many, if not all, elements.
- Software for translating data between EC standards and to handle communications and communications software associated with EC transmissions

- Computer equipment, including standard small to midsize processors that serve as network nodes, file servers, and workstations supporting EC applications
- Professional services for systems design, software customization, equipment selection and acquisition, systems integration, facilities management, education, and training

2. Federal EC Market Characteristics

In many respects, the federal EC market parallels the private (commercial) sector. However, government agencies have some unique requirements related to the political process. Federal agencies need EC to provide:

- Information that is directly usable by their computers
- Reduced turnaround time for transactions
- Reduced acquisition costs
- A better service record to the public
- An improved reputation with Congress, leading to more success in securing funding resources

3. Government EC Sectors

Computer-aided Acquisition and Logistics System (CALS) - CALS is included repeatedly in this EC report because of its enormous role in establishing EC-related standards and digital exchange techniques for documents. It has done much to get the concept of EC out into public view and sparked other agency interests. Through a variety of pilot programs and continuing procurements, DoD is pursuing CALS with close and active industry participation.

CALS was initially viewed as a method of transmitting computer-aided design/computer-aided manufacturing (CAD/CAM) algorithms. The concept involves only the transfer of design algorithms from one engineering workstation to another. In October 1990, Navy officials accepted the Engineering Data Management Information Control System (EDMICS) for this CALS function. At first EDMICS will be implemented at six Navy sites and two DLA sites and will eventually replace manual data repositories at 47 Navy, USMC and DLA sites.

INPUT believes that CALS will continue to evolve to include all recognized electronic commerce standard formatted transactions. In October 1991, all DoD CALS efforts were consolidated into Joint CALS (JCALS). The Senate transferred \$250 million for 25 separate CALS programs into a single account.

Electronic Data Interchange (EDI) - EDI is the standard developed in the commercial marketplace to transmit business documents such as purchase orders, shipping notices and invoices. The American National Standards Committee (ANSI) X.12 subcommittee has certified a document type to handle almost every possible type of business communication (See Appendix G). EDIFACT is the standard used for similar international transactions. Effective September 30, 1991, the Department of Commerce approved the Federal Information Processing Standard (FIPS) 161, which mandates the use of ANSI X.12 domestically and EDIFACT internationally.

The federal government uses EDI when it acts as a commercial entity purchasing commodities that range from office supplies to bullets. In January 1991, DoD merged the CALS and EDI efforts.

Electronic Funds Transfer (EFT) - EFT is the process whereby actual dollar value is transferred from one account to another electronically. The government uses the Automated Clearing House (ACH) standard used by the U.S. banking community. The government can pay its suppliers electronically and receive fees, duties, and taxes via EFT. Some government entities even accept credit cards (USPS, U.S. Mint & GPO) when acting in a commercial capacity. EFT will eventually be included in CALS.

Electronic Benefit Transfer (EBT) - EBT is very similar to EFT. This allows the recipient of a government benefit to receive payment electronically. This could be a relatively standard transaction like the electronic deposit of a government retirement benefit or a Social Security benefit. Another example is an advanced pilot study to replace the USDA/FNS Food Stamp program. The recipient has an account that is credited with his or her benefit payment. Withdrawals are made at grocery store check-out POS terminals, using an ATM-like card and PIN number.

Electronic Document Transfer - To the publishing industry, CALS means a standard format for the transmission of electronically published documents. Two major standards exist in the publishing industry: Standard Generalized Markup Language (SGML)—ISO 8879 standard, and Office Document Architecture (ODA). The Association of American Publishers (AAP) has implemented SGML for use in books and journals. DoD has done so for technical manuals. ODA is oriented toward documents produced with word processing or desktop publishing software. INPUT expects SGML to be included under CALS.

Electronic Filing - Electronic filing should be considered a private or unique format utilized by various government agencies to accept submissions by companies, individuals, and state and local governments. These filings are usually required by law and are often accompanied by a fee or tax payment. In a well-known application, various tax preparers can file individual IRS form 1040 submissions electronically. Electronic filing is not necessarily a unique application. Under FIPS 161, it will probably be forced to comply with ANSI X.12 or be certified as an X.12 document type.

Industry Formats - Prior to the involvement of ANSI X.12, numerous industries agreed on standards to electronically transmit documents that were unique to their industry. Health claims are submitted in either HCFA 1500 or UB82 format. Rail transport has a set of standard documents coordinated by TDCC. The automobile industry has its own set of documents. In some cases, when dealing with these industries, the government has used that industry's electronic format. Over time, most of these individual industry standards will be modified to conform to ANSI X.12. If they are unique, they could become an ANSI X.12 standard document.

Private Formats - Most organizations use private or proprietary formats for primarily internal applications. These occur mainly in systems that predate the acceptance of ANSI X.12 standards or for unique, single-purpose systems. For example, the Federal Aviation Administration (FAA) DUATS system allows general aviation and corporate pilots to file flight plans and receive weather briefings from any PC with a modem. The FAA provides all communication and translation software. The U.S. Treasury/FMS GOALS system allows the electronic clearing of financial transactions between other government agencies. Since the government agencies are large customers of each others' goods and services, this eliminates a large volume of paper transactions. The DoD has a long history of proprietary standards for procurement, such as POPS, MILSTRIP and MODELS. The functions of these older DoD standards will eventually be replaced by ANSI X.12 or CALS formats.

4. Vendor Adoption of Products and Services for the Federal EC Market

Vendors to the federal EC marketplace are gaining experience in adapting commercial products to better accomplish the objectives of federal agencies for cost-effective and productive EC systems. At present, software features have taken on greater importance, but as systems grow, communication features will gain in importance.

Vendor product release announcements are now focusing on several areas of federal EC needs. These include:

- Accommodating a variety of hardware platforms
- Translation of CALS, ANSI X.12, TDCC, and EDIFACT standards

- Service support/technical assistance
- Industry reputation/experience

Meeting these criteria is essential to remaining competitive in the federal arena.

Several recent actions taken by a few of the larger companies in the industry serve to further illustrate vendor direction in capturing federal EC business:

- GE Information Services is increasing systems integration services.
- AT&T is reselling activities and publishing EDI application program interfaces.
- Digital Equipment is launching additional EDI products and services, including consulting.
- CSC developed the winning CALS effort.

Additional products targeted to the federal marketplace are being released as continuing developments occur in the commercial sector, especially in the graphics area. Furthermore, the gradual migration to established standards and adherence to security requirements will add to the modification and release of software and communication devices geared to federal users.

C

Market Forecast

As indicated in Section A above, the federal EC market has matured somewhat in the three years since INPUT's last report on the EDI market.

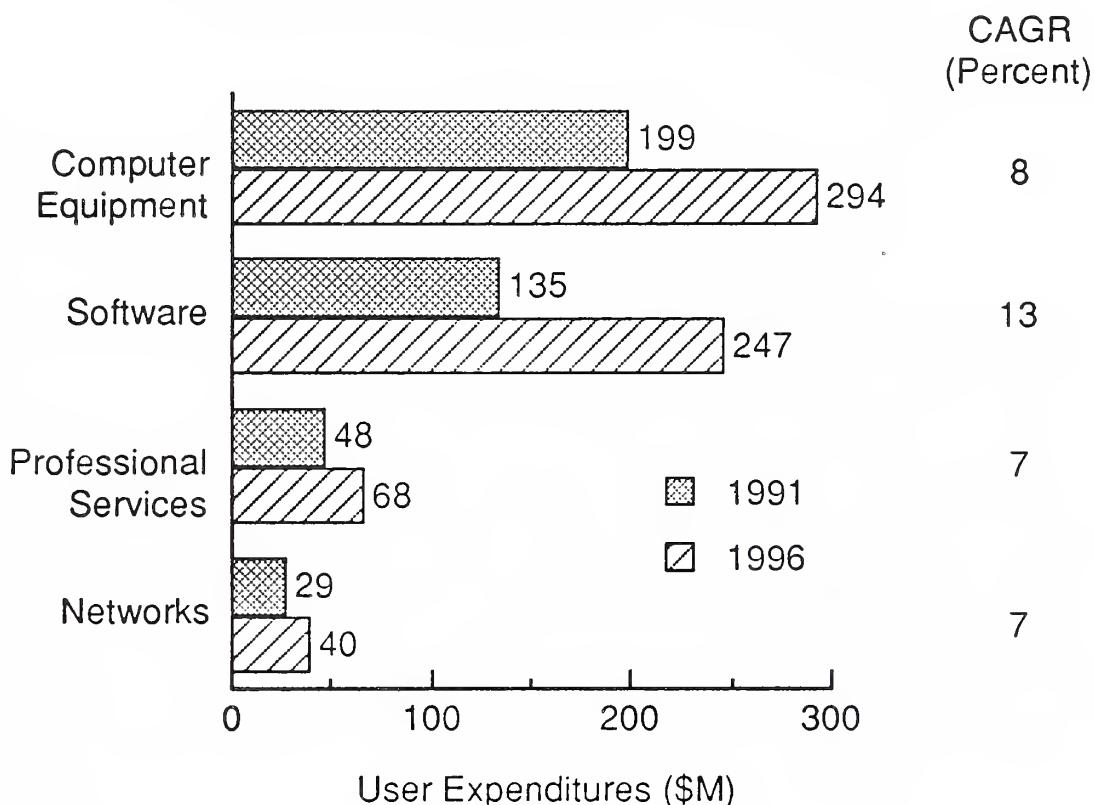
Exhibit III-4 summarizes the market size and growth rates of the federal EC market. Growth is occurring primarily in the software products area, reflecting:

- A continuing need to realize the productivity gains associated with EDI implementation
- A growing trend among some network service providers to heavily discount their federal prices
- A major increase in the emphasis on CALS

Exhibit III-4 provides a breakout of the federal EC market by service and equipment segment. INPUT estimates that the overall market will grow from \$411 million in FY 1991 to \$649 million in FY 1996, a CAGR of 10%. The market size and growth are dependent upon the definition of the programs that conform to EC. INPUT defines this market to include identified programs using a recognized EC format. INPUT believes this to be a conservative analysis.

EXHIBIT III-4

Federal Electronic Commerce Markets



Additional opportunities exist for EC contained within new system procurements and upgrades. Because of the large size and uncertain funding of several programs, the market size could change dramatically. For example, the USDA/FNS pilot project to electronically replace food stamps could result in major equipment purchases. INPUT will reevaluate this market in 1992.

Some projects are government initiated and controlled, but paid for by their commercial users. For example, the GSA/FSS EDI system is provided at no cost to GSA by GEIS. The SEC EDGAR system is expected to cover its cost through the sale of access to the collected information. This reduces the apparent federal market size.

Exhibit III-5 separates the defense EC market from that in the civilian agencies (Exhibit III-6). INPUT estimates that the defense EC market will grow from \$293 million in FY 1991 to \$472 million in FY 1996, at a CAGR of 10%. This growth is primarily for CALS development and use. Defense network uses and purchases will grow more slowly than that in civilian agencies, because of the use of DDN.

EXHIBIT III-5

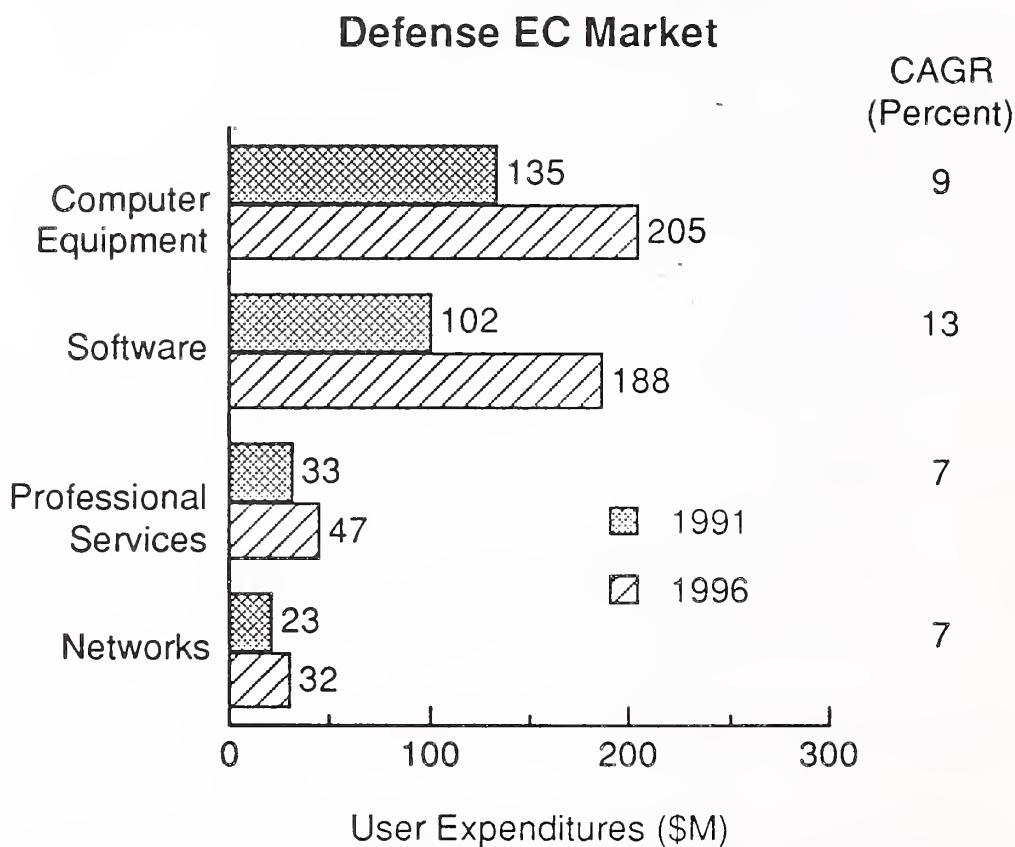
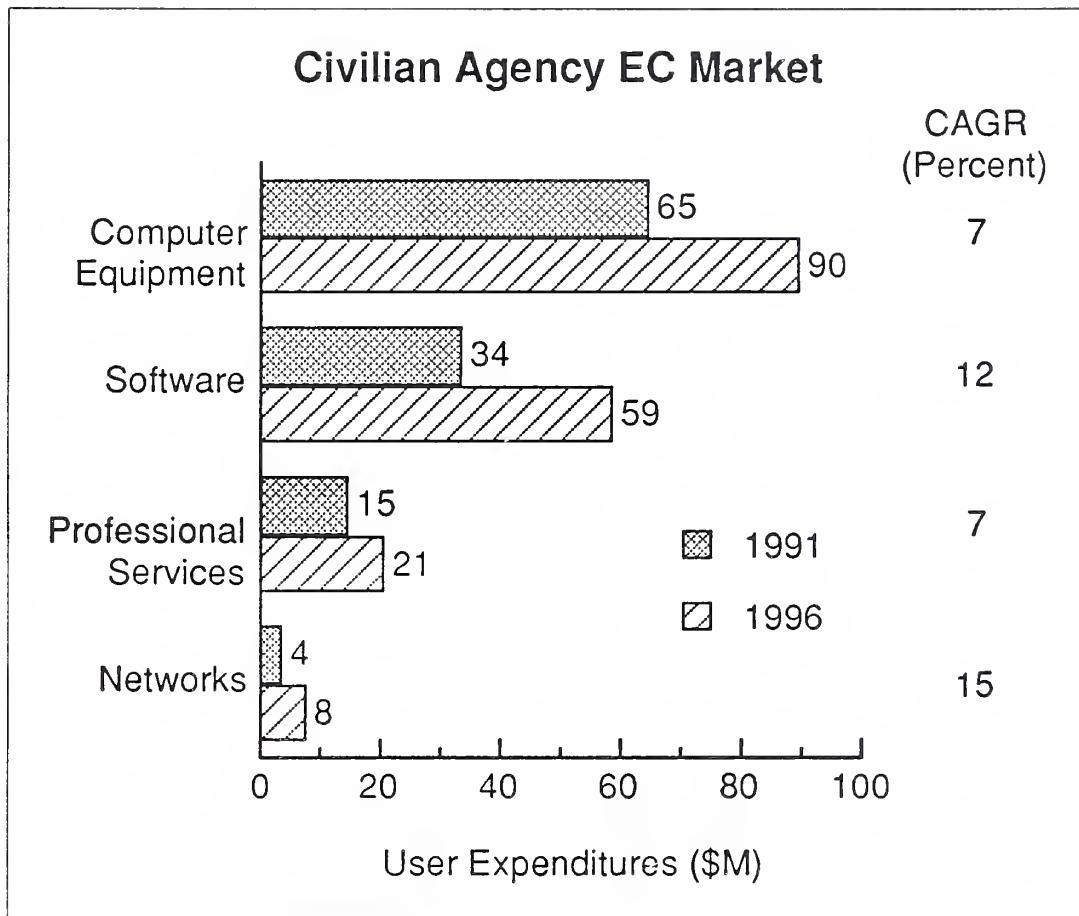


Exhibit III-6 shows civilian agency EC market size and growth. INPUT estimates that the civil agency market will grow from \$118 million in FY 1991 to \$178 million in FY 1996, at a CAGR of 9%.

EXHIBIT III-6



The large federal budget deficit and recessionary economy will continue to lead to cuts in civilian and especially DoD IRM budgets. This will have a varying impact on EC projects. It will be very difficult for agencies to remove or reduce funding for projects that have successfully completed their pilot or phase I stages. Planned and requested systems that have not been initiated could be postponed. Each project must be evaluated separately; clients should use INPUT's hotline service and review the Procurement Analysis Reports (PARs) for specific information.

D**Federal Market Issues**

The interaction of the five major factors listed in Exhibit III-7 will drive the federal EC market over the next five years. While some areas and agencies will grow fairly slowly, others will experience faster growth as EC gains a foothold in agency applications.

EXHIBIT III-7

Federal Market Pressures

- Budget and deficit reduction
- Policy and regulation
- Highly visible/successful EC systems
- Advances in standards
- FTS 2000

Despite the continuing budget reduction pressure and other deficit reduction measures, INPUT believes that the effects of budget constraints will be mitigated somewhat in the federal EC market segment. Budget reductions actually may increase federal dependence on EC services. EC use will be emphasized to reduce processing, payment, and other costs at some agencies and to improve the productivity of systems that interface to the public, especially procurement systems.

The policies and regulations impacting EC are still evolving. OMB has drafted a policy directive for agencies that encourages their use of EC.

Agencies are gaining greater awareness of EC through several highly visible EC applications being implemented through recent agency awards. These include:

- SEC EDGAR Project for electronic filing of corporate documents
- Navy EDMICS Program for an engineering and image processing system
- GSA—Federal Supply Service EDI Program for sending invoices and bills of lading to suppliers
- The IRS electronic filing of business and personal income tax returns

Each of these awards is discussed in greater detail in Chapter IV of the report. However, they are mentioned here to illustrate that several governmental agencies have already implemented EC projects. These projects are stimulating awareness of the EC concept and benefits to other sectors

of the government. In contrast with industry, the lengthiness of the process for developing EC pilots and the procurement cycle delays system initiation. The vast magnitude and phased implementation of federal EC projects make federal EC development much slower in achieving full operation. The size of these systems causes considerable initial costs and elapsed time, but the benefits are also proportionally great. Fortunately, lessons are being learned from each agency award, pilot and implementation that will make future procurements go more smoothly and quickly.

The federal EC market will expand as advancements are made in standards. Already X.12 is gaining a strong foothold in most federal agencies. Furthermore, NIST has a mandatory FIPS standard. The international standard EDIFACT is recognized in some agencies, such as Customs, as the only standard that allows for full participation among trading partners worldwide. Some civilian agencies may resist CALS because of its DoD heritage. However, as it includes EDI, EDMICS, SGML and other standards, INPUT expects it to be used governmentwide.

Federal agencies appear to be ready to implement systems under GOSIP, the Government Open System Interconnect Profile. GOSIP is a subset of the international Open Systems Interconnect Communications standards. GOSIP will support interoperability and data exchange among different federal computer systems and communications networks. Agencies will use GOSIP to integrate their multivendor networks and systems. However, INPUT expects many defense agencies to continue to use TCP/IP, an incompatible approach.

The FTS 2000 award brings a promise of greater availability of the latest telecommunication technology. Agencies should also realize economies of scale, but this has not yet happened. Agencies will become more demanding and sophisticated in their telecommunications requirements as related to EC. They may either ride FTS 2000 or, when appropriate, initiate their own requirements. Technological advances arising from FTS 2000 may change the nature of some EC system designs. For example, as better network management tools become available, agencies will come to expect the resulting economies and efficiencies. DoD will continue to use DDN as an alternative to FTS 2000 and VANs.

E

Federal EC Vendors

In the federal marketplace, various types of vendors provide EC products and services. Currently established vendors include:

- Network/communications firms
- Computer equipment manufacturers
- Software firms
- Professional services firms

- Associations
- Major accounting firms
- Independent consulting firms

Companies that are well known as federal systems integrators are also participating in the federal EC market. Furthermore, INPUT expects the Regional Bell Operating Companies (RBOCs) and data communications consultants to become strong players in the future.

EC currently uses fairly straightforward software and data communications methods. Additional companies will likely address federal end users' needs for more sophisticated EC systems as new technologies and new techniques are applied to EC.

The largest and most publicized EC activities are currently coming from the leading vendors shown in Exhibit III-8: GE Information Services, CSC, EDI, Inc. and Martin Marietta. This list was developed from agency surveys.

The other major players, including PRC, Xerox, RMS, Western Union, AT&T, DEC, and IBM, are recognized for their ongoing development of products and services directed to the government market for EC. As the marketplace continues to evolve, more companies—especially software and professional services companies—will likely be identified with the federal EC market. The largest and most publicized EC activities are under way among the leading vendors shown in Exhibit III-8.

EXHIBIT III-8

Leading Vendors in the Federal EC Market

- GE Information Systems
- EDI, Inc.
- BDM
- Martin Marietta
- Xerox
- CSC

The federal government is taking a leading role in the inclusion and combination of numerous industry standards in its major programs. As a result, competition could suddenly appear from unusual areas, such as publishing or banking.

The trend toward consolidation among federal contractors has become evident in the EC market. Some mergers among smaller firms are taking place now, with larger ones expected in the next few years. Recently Disclosure, Inc. bought Federal Document Retrieval, Inc. (FDR) in order to expand its federal coverage. Disclosure provides an on-line data base on SEC and corporate information. FDR provides information electronically from various sources, including banking and regulatory agencies.

AT&T is establishing a variety of EC relationships. It is currently supplying software vendors with network interface modules. This will enable the vendors to modify their products to facilitate running them over AT&T's value-added network. In a related move, AT&T is now selling EDI software from a small firm named Supply Tech, Inc.

In a larger move, British Telecom (BT) bought Tymnet from McDonnell Douglas for \$355 million. Included among Tymnet applications is EDINET, Tymnet's EDI offering.

Sterling Software Ordernet bought Control Data's (CDC) REDINET offering, including its federal government offering.

In January 1991, Planning Research Corporation and Advanced Technology, Inc. (ATI) merged to form PRC, Inc. They were former teammates on the Navy EDMICS project.

CSC will play a major role in the federal EC market, because of its team's position as finalist in the CALS competition. As the winning team, it will capture a major federal EC market segment. Because Xerox has achieved substantial CALS experience, it will still be a factor in that market.

F

Lawrence Livermore National Laboratory

At this time, Lawrence Livermore National Laboratory (LLNL) has the lead role in developing and providing government network and translation software. This effort operates currently on a UNIX-based transparent network gateway router (the Intelligent Gateway Processor). LLNL has developed and tested software combining CALS and EDI transmission, encryption and translation. LLNL is also using FTS 2000, Internet and Defense Data Network (DDN) for data transport. It is possible that the government will become its own supplier of some software and value-added network (VAN) services. DoD plans to consolidate electronic

messaging and data communications onto the Defense Data Network. The key to the implementation will be use of the X.400 messaging protocol and the X.500 directory system. The prototype is known as the Standard Automated Remote AUTODIN Host (SARAH).

In August 1991, DoD and LLNL began conducting three pilot projects at LLNL, the Wright Patterson Contracting Center and the Defense Personnel Support Center with 100 companies. The Army, Air Force and DLA have said they will adopt the system as soon as possible if the pilots succeed.



Agency Requirements and Trends

A

Agency Environments

The federal government's requirements for processing and distributing large volumes of business documents and data in a timely and cost-effective manner have fostered continuing interest in EC. The agencies' growing confidence in the technology, the evolution and greater acceptance of standards, and the need to make the government more efficient and productive will likely produce an increasing number of pilot programs and greater adaptation of EC systems to other applications.

Exhibit IV-1 gives the status of EC programs at some agencies. The agencies were divided into planning and user categories for this study.

- Half of the planning group of agencies were at the earliest stage of investigation for developing an EC system, while another third were more actively planning.
- For the user group, an equal share (38% each) were either actively implementing or already utilizing a system.
- Sixteen percent of the users were designated as just beginning to investigate EC. These respondents are looking at EC for their particular organization, but already had some familiarity with EC at their agency.

Agencies just beginning to look at EC are using either their information services department or a functional department to manage EC activities. Agencies that are near to implementing or already using EC are evenly split between using either functional departments or information services offices to manage EC implementation. In some cases, agency program offices are taking management roles in EC projects. This suggests that vendors of EC products and services to the government may need to visit multiple agency officials to get their message across.

EXHIBIT IV-1

Status of EC Programs at Federal Agencies

Status of EC at Agency	Percentage Agency Groups	
	Planning Category	User Category
Just beginning to investigate EC	50	16
Actively planning an EC project	34	-
Close to implementation of EC project	16	8
Actively implementing an EC project	-	38
Utilizing agency EC system	-	38

Agencies were queried as to what type of support they have used for planning and implementing EC systems. Sixty-five percent of the total agencies specified use of contractor support. Exhibit IV-2 shows the ranking order for type of contractor used by the respondents based on frequency of mention. In most instances, EC contractor services were acquired from a communications firm/VAN provider. The VAN providers cited by the agencies are some of the leading vendors in the federal EC market (i.e., GE Information Services, etc.)

Contractor services from independent consultants or remote computer service firms were mentioned less frequently by the respondents. Only a small share of the respondents used a professional services firm or an industry association to assist with the development of an EC system. INPUT's initial 1989 federal EDI report had indicated that professional services organizations were mentioned as being used slightly more often than either communications companies or independent consultants. Software companies were also noted for having been contractors to agencies for both initial test systems and subsequent full-implementation phases. The growth of software products business in federal EC may change the perception of the role of software companies.

EXHIBIT IV-2

EC Contractor Support

Type of Contractor	Ranking*
Communications Firm	1
Independent Consultant	2
Remote Computing Service	3
Professional Services Firm	4
Industry Association	5

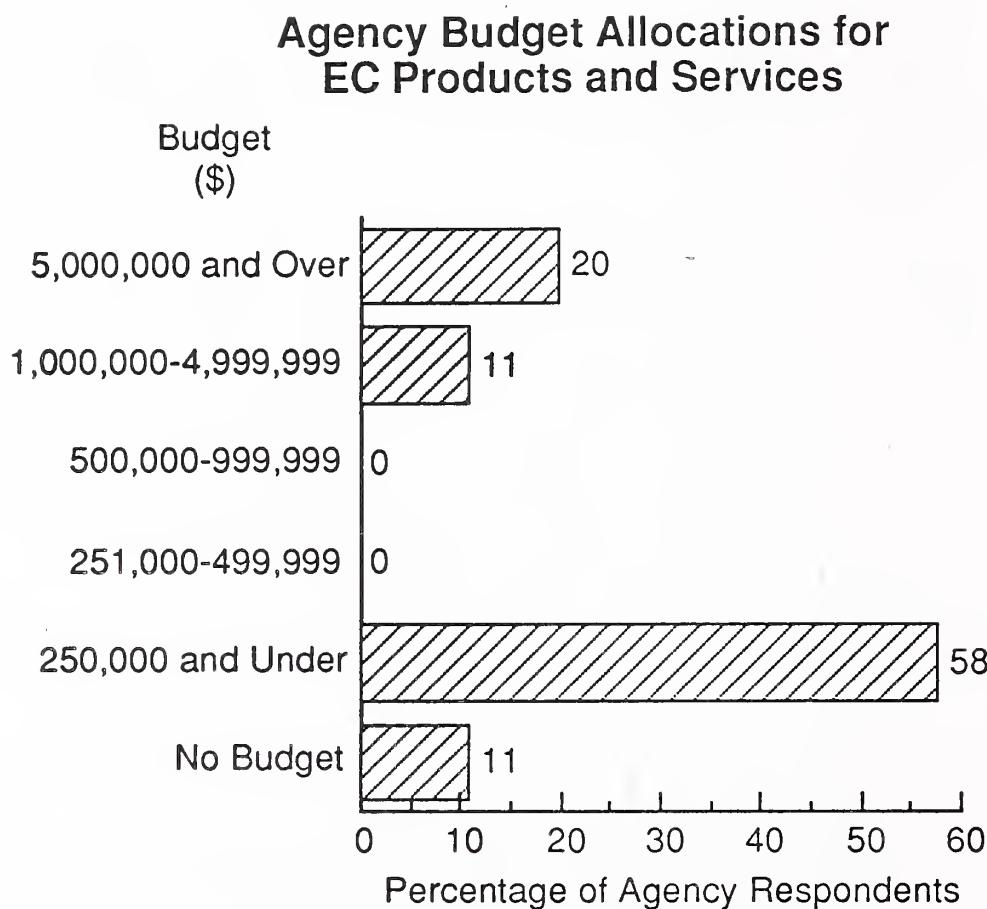
* Based on frequency of mention by agency.

Federal agencies are spending varying amounts of their budgets for yearly expenditures related to EC products and services. As shown in Exhibit IV-3, 58% stated that they directed under \$250,000 of their agency or specific organization's budget to EC. Twenty percent specified larger budgets of over \$5 million. The agencies that accounted for such high budget levels were the Department of Treasury and the SEC with its EDGAR Program.

One agency respondent noted that "there is no such thing as an EC budget" in the government. This statement implies that in some instances, funding for EC must come from other programs, is embedded in other programs, or is nonexistent at this time. It should also be noted that projected costs for federal EC programs will vary greatly depending on system complexity. The number of locations to be automated and types of operations will also play a role. This complicates market sizing efforts, as discussed in the previous chapter.

There is a great potential for ancillary revenue for EC vendors. If an agency is implementing EC, it may also need to electronically transport the document and data within the agency. This might occur both prior to external transmission and once an EC document is received. This could create the need for enhanced in-house systems, including custom software, workstations, and LANs.

EXHIBIT IV-3



Note: 53% of respondents indicated amount was allocated for total agency, while 47% indicated budget was for specific organization only

The Computer-aided Acquisition and Logistics Support system (CALS) is the DoD's largest EC-related effort to promote the interactive exchange of standardized logistics documents in digital form. CALS extends to the weapons systems development, procurement and operational maintenance efforts of the defense agencies. The program will greatly reduce the amount of paper handled by the logistic systems. Section B contains additional information on the CALS program, and specific agency initiatives are identified in Chapter VI.

Conformance with CALS standards is ordered for DoD weapons programs as a result of an August, 1988 DoD memorandum issued by Deputy Defense Secretary Taft. The memo established the future direction of CALS implementation by adding requirements for training of armed services personnel to utilize the standards, and modifications to technical data bases for acceptance of digital input. OMB and the Department of Commerce have strongly endorsed the CALS initiative.

CALS will be implemented on a phased basis. Phase I as planned for the early 1990s involves the replacement of paper document transfers with digital file exchanges. Phase II for the early 1990s and beyond focuses on the redesign of computer processes to formulate a shared data base environment and enhanced communications capabilities. Phase III involves the utilization of the data bases.

Like other government EC programs, CALS poses some future security and on-line accessibility issues for the DoD contracting community, but on a larger scale. Eventually CALS proposes to require direct governmental access to contractors' data bases. At present, industry remains somewhat ambivalent about this direct exchange aspect of the program. However, work continues, with industry participation on the development of CALS standards and other industry supported areas.

B

Functional Requirements

1. Current and Future Applications

The federal government is seeking to reduce the paperwork burden primarily in the areas of purchase orders, invoices and payment processing. The government is looking to EC to solve some of its functional requirements in these areas in a more cost-efficient manner as some agencies migrate to a paperless environment. In addition, the DoD agencies' missions are another driving force toward implementation of EC, as it has the potential of providing a variety of mission support capabilities. Furthermore, the planned integration of EC capabilities with other agency applications, in both civilian and defense agencies, will play an important role in future system development.

Agencies identified current and future applications to be run on their organizations' EC systems. Exhibit IV-4 lists the applications that agencies have in current operation and those they expect to use EC for in the next two to five years. Although one-third are currently running the top seven procurement-related applications from the exhibit list, payments and invoices show the highest future potential for use. Distribution of cost quotes is the fastest growing application area.

Those who are just in the planning phase for EC cited procurement functions, purchase orders, invoices, ordering and administrative messages as applications most frequently planned for their initial and future EC systems. The majority of agencies were unable to specify a timeframe for bringing any of the proposed applications onto an EC system either for 1992 or looking ahead to 1996. This reflects the general waiting and watching attitude toward EC of many federal agencies, while they monitor standards and various guidelines being developed. Furthermore, the agencies had previously estimated that implementation of a system usually takes two years once a test site is operational.

EXHIBIT IV-4

Federal EC Applications by User Agencies

Applications	Percent of Agency User Respondents	
	Current	Future
Payments (EFT)	33	75
Invoices (EDI)	33	75
Data Transfers (EDI)	33	64
Financial (EFT)	33	58
Electronic Funds Transfer (EFT)	33	58
Procurement Functions (EDI & SGML)	33	50
Purchase Orders (EDI)	33	50
Bills of Lading (EDI)	25	58
Ordering/Solicitations (EDI & SGML)	25	50
Transportation Functions (EDI, EDIFACT/TDCC)	25	50
Personnel/Human Resources (EDI)	25	33
Requirements Data Base (CALS)	25	33
Cost Quotes (EDI)	17	50
Administrative Messages (EDI)	17	42
Inventory (EDI)	17	33
Distribution (EDI)	17	33
Collections (EFT)	8	25

2. Federal EC Programs

a. Scope

The potential for EC in the government is enormous. Government activities account for about one-third of the GNP. OMB/OFPP has identified over 2,400 procurement offices using 200-400 thousand vendors. Over \$200 billion in contracts is awarded each year, using 21.6 million transactions.

DoD has identified one billion aperture cards, as well as one million different technical manuals being updated at a rate of millions of pages per year. Uncounted volumes of engineering drawings, regulatory filings, and payments of fees and taxes also will be automated. DoD represents 70% of all government purchases. In addition to 25 CALS projects, over 100 other EC projects are under way.

b. Treasury Department

The Treasury Department has developed a wide range of EC initiatives relating to funds transfers and electronic tax filings. U.S. Customs is using EDIFACT to assess duties and collect payments from some of the largest importers.

At Customs, import entry summary data is collected 84% electronically from 990 operational filers in 219 ports. An electronic bill of lading is collected from 51 carriers representing 75% of total ocean tonnage. Pilot systems are under development for air freight forwarders. The system also includes EFT to receive payments from over 500 payer accounts representing about \$25 million per day. Almost 40% of all collections are received electronically. This is part of a total FY 1992 budget of \$50 million that encompasses all import and export activities.

The Financial Management Service (FMS) oversees a program to transfer funds between Federal Reserve Banks. FMS is also testing EDI for collecting payments.

The Internal Revenue Service has a pair of pilot programs for electronically transmitting tax returns for individuals and businesses. It is estimated that switching from paper to electronic filings will save nearly \$200 million in processing, storage, and retrieval costs over the next few years. The IRS system relies upon a professional tax preparer to use a personal computer, IRS-approved software, and a modem. Four contracts were awarded in 1990 for this system: IBM, GAC, Memorex-Telex and Vion. Fiscal-year 1992 expenditures will be \$13.8 million.

In 1991, 35,000 tax preparers used the system to file 7,500,000 tax returns electronically. The incoming electronic forms are written to 12" WORM optical disks, storing 1,500,000 returns each. The tax preparer must still file a paper IRS form 8453 for signature, W-2s, and a few other documents. The system has expanded from the Ogden, Andover and Cincinnati centers to include Austin and Memphis. The IRS continues to expand and upgrade the system with additional lines, modems, storage, and workstations.

The Treasury Department awarded a major contract to CSC for System 90 to modernize the internal systems. It is anticipated that EC will be an element of that modernization. System 90 will support payments, claims, and reclamations for 950 million government payments. It will allow for EC processes such as electronic certification. System 90 is expected to cost \$13.7 million in FY 1992.

The FMS GOALS system has been evolving for 12 years. It has a proprietary electronic format to allow one agency to pay another for goods and services. GOALS is used at about 800 agency locations. GOALS uses CDC-developed software and the CDC VAN. GOALS has an annual cost of approximately \$2.5 million.

Vendor Express, another Treasury Department program that automates government agencies' bill paying, is currently being used by the Treasury as well as several other agencies. HUD, HCFA, Education and NASA have joined the program. Other government agencies, including the Postal Service and the Department of Labor, will be using the program shortly. The program was initiated in July, 1987 as a cost-cutting measure and to encourage federal agencies to make payments in a more timely manner to vendors.

The Vendor Express program utilizes the "Cash Concentration and Disbursement" format with one addendum record (CCD+1). This format is accepted by nearly all financial institutions and can be used to transfer funds through the Automated Clearing House (ACH). Because of its relative simplicity, over 14,000 institutions are involved with the Vendor Express program, and the number is expected to grow by the mid-1990s. Vendor Express is increasing from the current 75,000 payments per month to an expected 400,000 payments per month. Vendor payments only represent 3.7% of all Treasury payments. In 1991, EFT payments of all types, including Social Security and tax refunds, totaled 37% of all payments. EFT saved \$65 million in postage alone.

c. Securities and Exchange Commission—EDGAR System

The Securities and Exchange Commission (SEC), with contractor assistance from Arthur Andersen, ran a four-year pilot of the Electronic Data Gathering and Retrieval (EDGAR) System. EDGAR enables the SEC to receive annual reports, 10K and 10Q reports, and other corporate docu-

mentation through computers. For the pilot, some 1,000 companies volunteered to submit their financial forms electronically. The final system will contain data from all firms in the United States, and will be submitted either through a network, by diskette, or by magnetic tape. By August of 1991, a total of 100,000 electronic filings have been received in the pilot and 15,000 in the live production system.

In January, 1989 the SEC awarded an eight-year, \$52 million contract to a team led by BDM Corporation, which also included Mead Data Central, Sorg Corporation, Stratus, and Bechtel Information Services. In 1991, total system costs are estimated to have been \$95 million. BDM will assemble and manage the system. Mead Data Central will provide the group with search and retrieval capabilities for the SEC filings. Sorg Corp. will provide advice on the design, development and integration necessary to establish a complete and fully interactive EDGAR data base. Stratus Computer will provide the three mainframes for the system. Bechtel will continue to provide paper and microfiche dissemination of SEC filings. Disclosure Information Services is providing electronic access to the filings. CompuServe is the VAN of choice and also provides E-mail/bulletin board service. The EDGAR system uses the SGML electronic standard.

Ultimately, the EDGAR data base will be accessible through a variety of timesharing networks and value-added networks, with charges based on CPU cycles used. The information may also be accessed through remote terminals located at the SEC headquarters in Washington, D.C. and 8-10 field locations nationwide. It is expected that the system will become fully operational by mid-1993 with approximately 14,000 users. The SEC will require compliance of all companies except for proven hardship cases. It is expected that all EDGAR costs will be recovered through the regulated sale of EDGAR data and services. Funding for FY 1992 is \$9.4 million.

d. GSA—Federal Supply Service System

The GSA's Federal Supply Service (FSS) initially awarded a contract to Martin Marietta Data Systems (MMDS) for an EDI pilot project. Through its TSP offering, MMDS provided the electronic media for dealing with GSA suppliers. GSA initiated the pilot to test transmitting purchase orders to furniture vendors.

In a more recent, much publicized award of May 1989, the FSS awarded a one-year contract to GE Information Services (GEIS) that will allow the government free use of GEIS' EDI-Express System network services. GSA's trading partners will have to pay for their half of the service. The Federal Supply Service will now expand its use of the EDI system to other vendors that supply products to the government—potentially over 200,000 vendors.

In 1991, GSA/FSS had 34 vendor trading partners and sent 8,000 to 14,000 purchase orders per month. This represents only 10% of the potential. FSS is pursuing agreements with Federal Prison Industries (an agency of the Department of Justice) and General Motors. Both are large government suppliers. FSS currently exchanges purchase orders, invoices, notices of shipment, contractor reports of schedule sales, material safety data sheets, transportation audit system reports, government bills of lading, and requests for quote. Plans include expansion of document types, becoming a mode in the DLA system, and adding electronic catalogues and price sheets.

GEIS does not charge the government for sending its EDI transactions, but rather collects a fee from the vendors that submit their invoices to the FSS. The agency hopes to expand the types of transactions in the future to include solicitation documents and other transaction sets.

e. DoD—Computer-aided Acquisition and Logistics Support (CALS)

CALS is a DoD and industry initiative to enable and accelerate the integration and use of digital technical information for weapon system acquisition, design, manufacture and support. The CALS initiative will facilitate the transition from the current paper-intensive processes to a highly automated mode of operation, thereby substantially improving the productivity and quality of the weapon system acquisition and logistic support process. The Deputy Secretary of Defense initiated the DoD CALS program in September 1985, with the goal that new weapon system acquisitions would acquire technical data in digital form or obtain governmental access to contractor's integrated data bases in lieu of paper deliverables.

In general, the CALS program is divided into three phases. These phases are:

- Phase I - Conversion from paper to computer-based data and integration of DoD and industry computers
- Phase II - Redesign and consolidation of weapon support systems
- Phase III - Utilization of standard DoD data bases

The Army made Phase I contract awards to four firms:

- TRW - \$4.6 million
- BDM - \$4.4 million
- Xerox - \$4.1 million
- CSC - \$2.7 million

These awards cover detailed designs for an Army-wide CALS system. Each study must also address risk analyses and life cycle cost estimates.

Phase II awards for a ten-month run-off went to CSC (\$3.9 million) and Xerox (\$3.3 million). CSC is teamed with McDonnell Douglas, General Research, West Coast Information Systems, Management Systems Associates, and System Research and Applications Corporation. Xerox is working with CACI, Inc., Boeing Computer Services, Westinghouse Corporation, Advanced Technology, Inc., and Harris Corporation.

The Army recently awarded Phase III to CSC, at an estimated value of \$744 million. At this writing, Xerox has not yet filed a protest. The award for FY 1992 was \$10 million.

When it was separate, Army CALS total expected value was estimated at \$400 million with \$23.5 million in FY 1992. The combined JCALS effort is currently estimated at \$1 billion; estimated FY 1991 total expenditure was \$230 million. Though not covered by this report, it has been estimated that government contractors and vendors are spending an additional \$1 billion a year to make their systems CALS compliant. In addition to the civilian government agencies considering CALS, other commercial industry sectors, such as airlines, manufacturing firms, and telecommunications companies are considering CALS.

Section D discusses the development of the CALS standards—a joint effort of DoD, NIST and industry. A great deal of work is going on with respect to standards, as CALS involves more than just basic EDI technology. Additional system architectures, document structures, transfer of document techniques, and other technical aspects of CALS must be designed for unique DoD weapon system requirements, security restrictions and user functions.

The CALS initiative will continue to rely on a large amount of industry cooperation and assistance in order to meet its objectives. Several vendors are already active in product testing, spreadsheet development and technical publishing packages to support the DoD. Xerox, for example, is testing electronic publishing software for CALS compliance, in order to secure a bigger share of the market for technical and training documentation. Other vendors active in this area include Grumman Data Systems Corporation, Microsystems Engineering Corporation, Interleaf, and Lockheed. Future requirements for the numerous CALS-related programs will be forthcoming as work progresses. Major General Baldwin has been appointed the senior defense CALS executive in command of the Joint CALS Management Office (JCMO).

f. NAVY—Engineering Data Management Information and Control System (EDMICS)

The Navy's Engineering Data Management Information and Control System (EDMICS) has been adopted as the JCALS standard for electronic interchange of engineering drawings. In June 1989, Advanced Technology and PRC won the \$154 million contract to supply a storage and retrieval system for Navy engineering data, including hardware, software, installation and training. EDMICS will include a VAX-based host computer, Sun workstations, digitizing scanners, graphic printers and plotters, graphics display and editing terminals, and communications interfaces.

EDMICS will replace the current manual and semi-automated aperture card-based systems at eight primary engineering drawing repositories, and at approximately 40 other Navy and DLA sites nationwide. The Navy expects to improve technical data support to its facilities and fleet by applying commercially available technology for electronic storage, receipt, and distribution of engineering data. EDMICS has FY 1992 funding of \$10 million.

g. Other Examples

There are numerous systems in various stages of evolution and implementation that illustrate the potential for EC and its social and financial benefits. In many cases, these systems are only possible because of the availability and reduced cost of new technologies.

- Proposed use of a POS system to check criminal records of people purchasing guns
- Payment of U.S. Navy shipboard personnel through the use of shipboard computers and ATMs
- Use of “electronic dog tags” for an individual’s records, including medical, identification, pay records, personal and emergency information
- Use of smart cards for a variety of applications: military commissary checkout, agriculture subsidy payments, helicopter blade maintenance, guard dog records, and some 80 other projects
- Transport of textual records like civilian personnel records from OPM and Veterans medical or service files from DVA
- At the Environmental Protection Agency (EPA), the acceptance of electronic submissions from external parties for the Toxic Release Inventory and the Superfund Contract Laboratory Program

- The Department of Commerce, NIST established a program office to coordinate and integrate some federal EC projects. The office has an FY 1992 budget of \$2.7 million and \$4.1 million in FY 1993.
- A system at the Federal Aviation Administration (FAA) offered through a VAN allows pilots to receive weather briefings and file flight plans from their own PCs or those located at airports. This has greatly reduced the need for Flight Service Stations (FSS) and the associated personnel. For an additional fee, pilots can use flight planning software and receive weather maps.
- A system to use EDI to speed access to shipping data in the Great Lakes and Saint Lawrence Seaway Maritime Community. The Seaway Automated Information System (SAIS) uses EDI, E-mail, and electronic bulletin boards.
- USPS has an “Electronic Postage Stamp” pilot project that uses EDI to transmit postage statements that magazine and newspaper publishers must submit with their mailings.
- The Interior Department’s Minerals Management Service (MMS) is planning to spend \$60 million to migrate to electronic commerce by 1998. A pilot project is electronically moving standard reports received from companies drilling for oil in the Gulf of Mexico. MMS estimates a total potential paperwork reduction of 80%.
- The National Oceanic and Atmospheric Administration (NOAA) is developing an Electronic Administrative Support Interface (EASI) for frequent administrative transactions such as personnel requisitions and time and attendance reports. With over 650 NOAA sites, even a rudimentary EC system for basic administrative processes can have a large impact.
- The National Science Foundation (NSF) has developed the technical approach for pursuing electronic proposal submissions.
- The Office of Child Support Enforcement is establishing a \$20 million system to handle the electronic transfer of case files among states. Each state is required to have its own system by 1995. The state systems are 90% federally funded. Alabama’s system links 156 sites with 400 workstations to a Unisys central computer. The system cost \$13 million and manages 300,000 child support cases.

C

Performance Criteria**1. Computer Equipment**

As shown in Exhibit IV-5, the majority of the agencies with EC programs are employing a combination of mainframes, minicomputers, and microcomputers as equipment choices for EC systems. Minicomputers and mainframes are currently used by 73% of the agencies. Connections among the computers are achieved either by the agency's use of LANs or private networks. The agencies that are planning EC systems are primarily split between microcomputers and mainframes. The growing availability of EC software for microcomputers will sharply reduce the need for dedicated EC equipment at federal agencies.

EXHIBIT IV-5

Type of Computer Hardware Used by Agencies for EC Systems

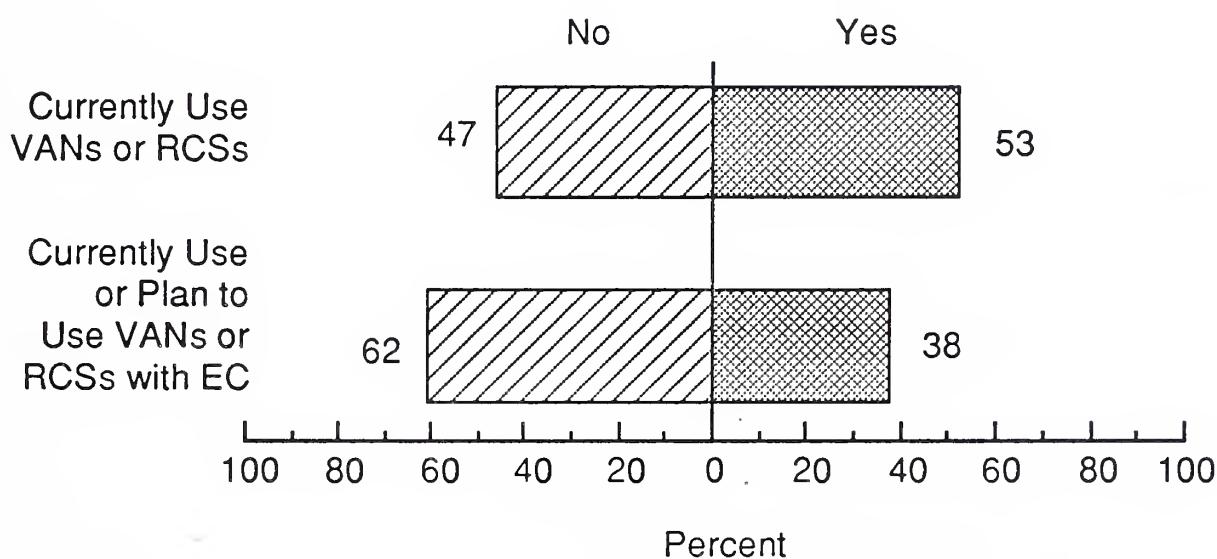
Type of Computer Hardware	Percent Agency Groups*	
	User Category	Planning Category
Microcomputers	50	64
Minicomputers	17	73
Mainframes	50	73

*Multiple responses

Value-added networks (VANs) and remote computer services (RCSs) provide the communications links for data transmission in EC systems. Agencies were queried on their use of either a VAN or an RCS. Exhibit IV-6 shows that the agencies are almost evenly divided in their current use of either VANs or RCSs. Agencies are acquiring these services from the major VAN providing companies such as BT Tymnet and GE Information Services.

EXHIBIT IV-6

Agency Use of Value-Added Networks and Remote Computing Services



Agencies' use of value-added networks and remote computer services has not changed from an earlier INPUT study. However, the percentage of agencies that currently use or plan to use VANs and RCSs with EC has increased from 53% to 62% since the last study. Presently, although stating that they have no plans to use these systems, several agencies may use these networks when further along in the implementation of their EC systems.

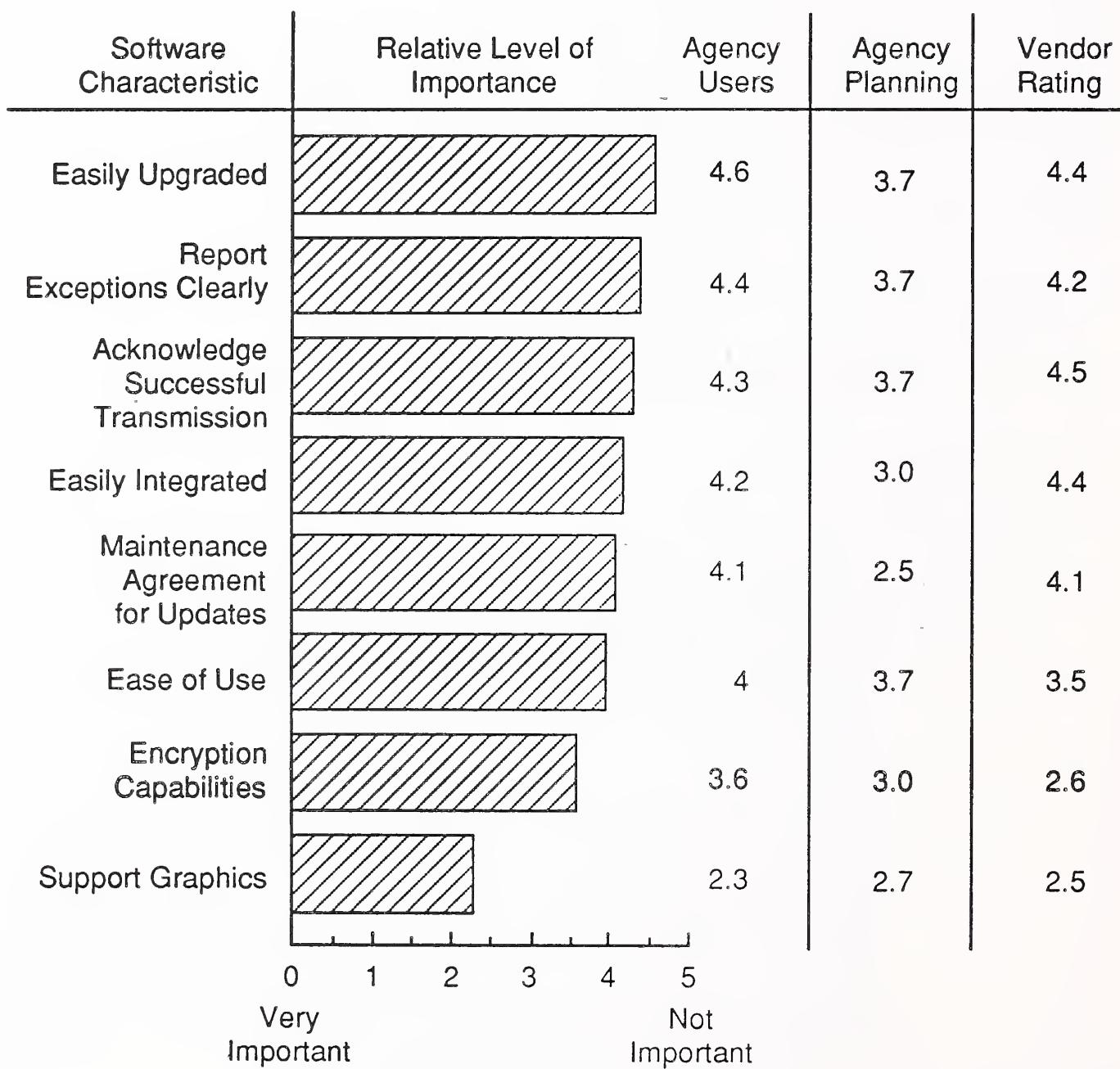
Agencies were questioned on their perspectives of the future impact of FTS 2000 on their implementation of EC network systems. The majority of the respondents at present did not wish to comment on the influence of FTS 2000. Some respondents did view EC systems as being incorporated into the planned scope of FTS 2000 and may eventually allow for use of the low-cost network with advanced capabilities. GSA has placed enormous emphasis on the use of FTS 2000 whenever possible. The DDN will also play a role in DoD use of EC.

2. Software Characteristics

Based on their experiences and perceptions of the present and future use of EC software, agencies were asked to rate the relative importance of specific software characteristics and features. As noted in Exhibit IV-7, agencies rated easy upgradability as the most important software characteristic. In the previous study, ease of use by non-computer-literate users was the most important characteristic. Experience may have changed the agencies' perspectives.

EXHIBIT IV-7

Agency Rating of Importance of EC Software Characteristics



The next most highly rated features are clear reports of exceptions and acknowledgement of successful transmissions. In this case, agencies may have become aware of the importance of these software characteristics through experience in the commercial sector. Currently, and also in the past study, encryption capabilities and support of graphics are not viewed as important by most agencies. These features may become more important when additional applications are added to EC systems.

3. EC Issues and Concerns

EC involves several issues including security, maintenance and standards that can directly influence market acceptance and the success of government EC implementations. INPUT asked agencies to rate issues having the greatest impact on their EC system plans and implementations.

Both groups (user and planning levels) rated network/data security as their highest concern (see Exhibit IV-8). The high level of concern for security stems from the need to keep much of the information about government procurement, its operations and its personnel confidential. Other parties receive this information only to perform needed services. EC systems will have to ensure continued restrictive access to classified data through multilevel security capabilities and other system safeguards.

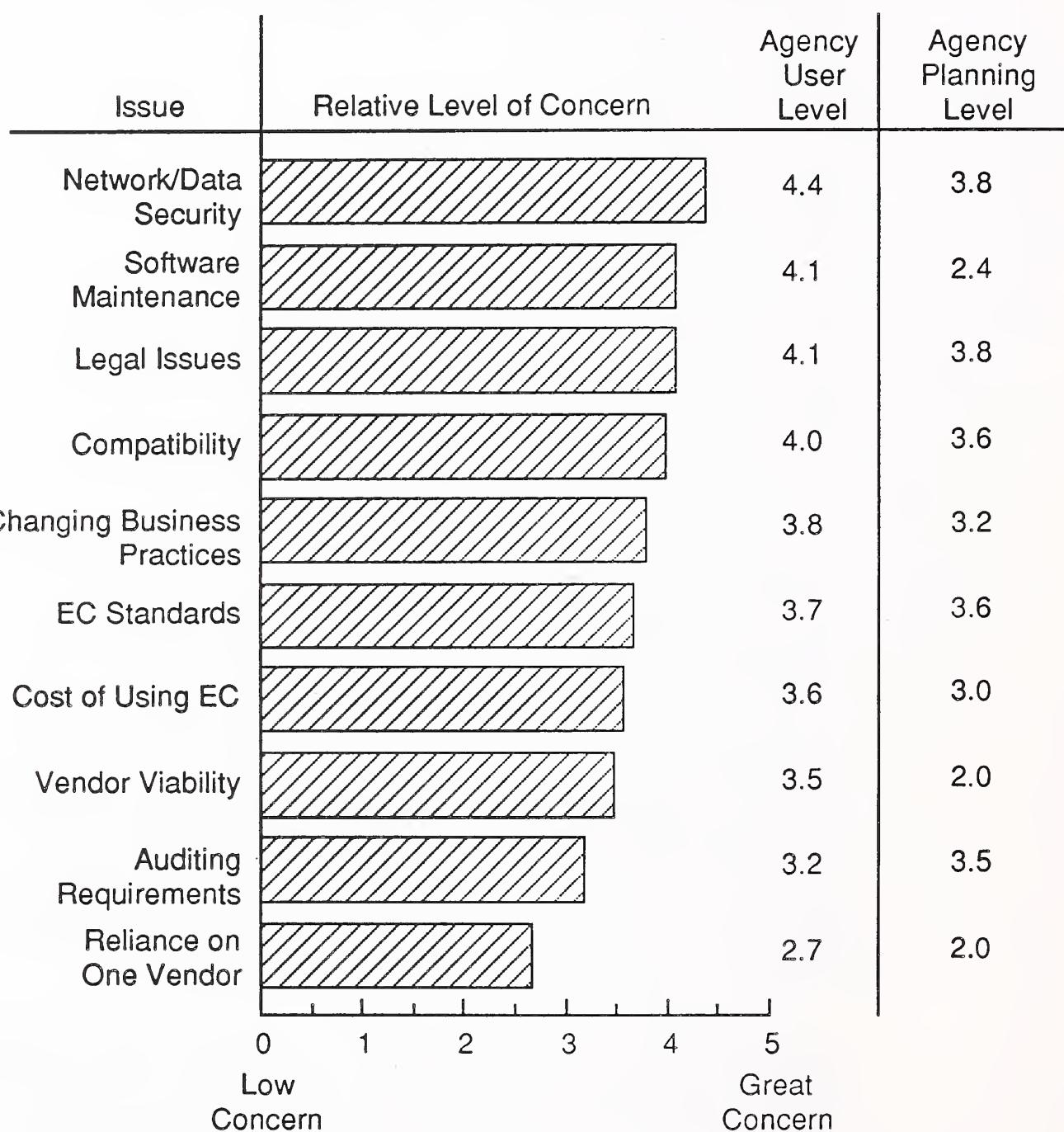
At present, software maintenance is of greater concern to the agencies at the user level than the planning level. This group is apparently more aware of the need for software to be updated and remain operational throughout the life of the system. Again, agencies have learned from the experiences and practices of existing commercial systems.

Legal issues still affect the government's adaptation of EC systems. All agency respondents are concerned with electronic signature and document authenticity issues. These issues have been identified, and are recognized and being addressed. Laws, regulations, and legislation are being reviewed and updated. Software is being modified to provide "electronic signatures" using smart cards, data keys, encryption, and other techniques to ensure data authorization and integrity. Legal issues also carry over into the auditing requirement concerns.

Agencies also remain highly concerned about standards and compatibility. Many federal agencies are planning strict adherence to industry standards. Delays in industry's adoption of additional standards may be slowing development of value-added EC-generated systems and data bases for procurement activities, government reporting, and other functions concerning the government.

EXHIBIT IV-8

Level of Federal Agency Concern with EC Issues



4. Critical Success Factors for Systems

Agencies were asked to comment on what would be critical success factors for an "ideal EC system" in five system component areas. The three most frequently mentioned factors for each component are identified in Exhibit IV-9. Compatibility and reliability factors appear throughout the exhibit as critical to the operation of any governmental system. Security is also of great importance. These factors reflect agency needs to exchange information on a regular basis while protecting the information from intrusion or unwarranted access.

EXHIBIT IV-9

Critical Success Factors for Components of EC Systems

Software

- Ease of Use
- Compatibility
- Reliability

Hardware

- Reliability
- Fault tolerance
- Compatibility

Communications

- Multiple interfaces
- Accurate/verifiable
- Security

System Response Time

- Consistently fast
- Handle batch applications
- Acceptable speed

System Integrity

- Security for confidential business documents
- Confident performance of system
- Same integrity level as paper system

D

Laws, Policies, and Regulations**1. OMB Policies on EC**

The Information Policy Branch of the OMB issued an internally distributed policy bulletin on EDI in May 1989 (OMB Bulletin 89-17). The bulletin's purpose was to supply guidelines for the use of EDI where it is economical and would utilize national and international standards. The major points of the draft policy included:

- Use of X.12 standards along with the already developed industry-specific standards (i.e., UCS in grocery and VICS in retail)
- Future migration to International UN Standard (EDIFACT)
- Priority use of commercial off-the-shelf EDI products and services

As part of the reporting requirements in OMB Bulletin 89-17, *Federal Information Systems and Technology Planning*, OMB surveyed 27 federal agencies on their EDI activities. Eighteen agencies reported one or more EDI applications, either in operation or in the works. Of those 18 agencies, 15 reported non-financial EDI applications and three reported only EFT applications.

The agencies' replies to OMB were generally that EC is a good idea but there were three areas of concerns that still need to be addressed:

- The costs associated with implementation of EC while there is limited or no funding directed to these projects
- The effect on small businesses for establishing procurement types of transactions
- The security and authenticity of data

The Office of Management and Budget is also strongly encouraging the use of EC at federal agencies by proposing to revise OMB Circular A-130. The circular, entitled Management of Federal Information Resources, was originally established in 1985 as part of OMB's general information policy under the Paperwork Reduction Act.

OMB is stressing the benefits of using electronic data interchange techniques, including the following:

- Savings due to better targeting of resources
- Less costly program monitoring

- Reduced data error rate
- Decreased costs of reporting and capturing data
- Speedier processing and transmission

OMB has selected several specific transactions for early conversion to electronic form. These are: material inspection and receiving reports, purchase orders and invoices, and progress payments. The DoD, DVA, and GSA, with assistance from NIST and the SBA, are working together to convert these transactions. OMB is continuing to work with and support the appropriate federal agencies to develop answers to legal, security, and standards issues.

2. DoD Policies on EC

In May 1988, the Deputy Secretary of Defense, William Taft, issued a memorandum to the military agencies to encourage the use of EC.

The Taft Memo, as it is known, promotes the following:

- Adherence to ANSI X.12 standards
- Transition to EC for business-related transactions by the early 1990s
- Coordination of applications in the areas of disbursing, accounting, or payments

As a result of the memorandum, defense agencies such as DLA have taken various actions including product supply and bulk fuel arrangements for EC. DLA also has an initiative referred to as SPEDE (for SAMMS Procurement by Electronic Data Exchange) to provide its supply centers with the capability of exchanging requests for quotes, vendor responses, and purchase orders using the X.12 format. Equipment requirements for various SAMMS projects (page scanners, engineering workstations, etc.) are funded at \$3.4 million in FY 1992. Other actions initiated or planned include the following:

- In May 1990, the Department of Defense created the Office of the Executive Agent for EDI to administer an electronic commerce program, initially aimed at automating military procurement but that eventually will be applied to all federal government procurement.
- The Army Transportation Operations Directorate in Indianapolis is using BT Tymnet EDI services to process bills of lading and transmit payments electronically (EFT).
- The Logistics Management Institute is helping the Army implement EC technology in a variety of other financial applications.

- DoD has begun a pilot program with its leading transportation vendors to exchange tenders for transport services.
- The Military Traffic Management Command is working with Sea-Land Corporation in testing a new electronic communications system.
- The Defense Investigative Service Clearance Office is using CompuServe's EC services to speed up the processing of security clearance requests.
- The Marine Corps is using EC technology to pay the freight bills associated with its commissaries.
- The Army is using GEIS software, network and professional services as part of the Standard Depot Systems Modernization.
- The Navy SPAWAR will issue a dual Phase I award for a CALS-compliant system to provide for the automation, generation, data exchange, storage and update of the Integrated Undersea Surveillance System.
- The Navy and the Newport News Shipbuilding and Dry Dock Company are using CALS to manage the large-scale task of ship design, construction and maintenance. The Seawolf program is the first to make real-world use of CALS and is 100% electronically designed. This CALS example, Seawolf Automated Integrated Logistics System (SAILS), runs on an IBM ES/9000.
- In May of 1991, San Antonio-based Docucon, Inc. was awarded a contract for \$12.4 million for document conversion for the Navy Publishing and Printing Service (NPPS). NPPS is a leading provider of document conversion services in support of DoD CALS.
- DLA is planning a system using CALS to improve the management of an estimated \$30 to \$100 billion of excess DoD inventory.
- The USAF Logistics Command (AFLC) has successfully tested images from General Electronic Aircraft Engine Corporation (GEAC) showing that it complies with CALS. By no coincidence GEAC is a major internal user of GEIS EDI services. As a result of this test, GEAC will deliver engineering drawings for F110 engines electronically. AFLC officials have estimated total spending for electronic engineering drawing systems at about \$30 million.

Agency respondents noted compliance with the intent of the Taft Memorandum and that it will continue to impact the growth of the federal EC market.

3. Other Agencies

The Department of Commerce, NIST has issued FIPS-161 mandating the use of ANSI X.12 domestically and EDIFACT internationally (see Appendix H). A proposed standard for electronic signature is being circulated for comment. During the summer of 1990, Congress attached HR 5302, the Small Business EDI Technology Promotion Act, to the appropriation bill for the Small Business Administration (SBA). The administrator of the SBA is directed to study the impact of EC on small businesses.

The House Government Operations Subcommittee has introduced legislation to amend the Paperwork Reduction Act to allow access to the government's electronically stored records. During reauthorization hearings on the Paperwork Reduction Act, an amendment was added to extend the Freedom of Information Act (FOIA) to apply to computerized, digitized and electronic information. In applying the existing law, some agencies do not view computer records as equivalent to paper.

In amending the law, a controversy has arisen concerning the form of government records. It involves potential competition with private companies that currently provide the public with data electronically. Furthermore, there are programming issues associated with the government fulfilling requests for electronically stored data. Another related piece of legislation, entitled the Information Policy Act, has already been introduced by the government Information Dissemination Subcommittee and addresses dissemination of electronic information to end users. OMB maintains that electronic records are legal and admissible under Rule 1001, Federal Rules of Evidence. U.S. Code, Title 44,3301, includes electronic records as valid federal records.

In another regulatory area, GSA recently completed a rewrite of the Federal Information Resource Management Regulations (FIRMRs). It is expected that the revised FIRMR will better comply with both the Paperwork Reduction Reauthorization Act and the Federal Acquisition Regulations (FARs). It remains to be seen what effects, if any, the new FIRMR will have on the acquisition of EDI products and services. The current FIRMRs and FARs are available from GSA on CD ROM.

EPA has issued an agency policy on electronic reporting. Previously, EPA Order 2180.2 codified the electronic transmission of laboratory measurement results. EPA established an agency coordinating committee for the implementation of electronic reporting.

4. Standards and Compatibility

The dominant, but still evolving, EDI standard is the American National Standards Institute (ANSI) X.12 standard. ANSI has taken a leadership role in coordinating standardization activities within the industry and efforts for approval of transaction sets. There is also a movement toward compatibility of industry-specific and private EDI standards with X.12 transaction sets. This potentially conflicts with the more common international standard, EDIFACT. FIPS 161 directs the usage of ANSI X.12 domestically and EDIFACT internationally.

Most federal agencies are eager to use industry standards. This is especially true for DoD agencies. DoD has joined the X.12 organization and will attempt to work with the commercial community in its EDI implementations. DoD agencies are utilizing industry's X.12 and TDCC standards. The CALS program has also implemented on a phased basis specific standards that are, in turn, being used in other programs that exchange data.

- MIL-STD-1840A, "Automated Interchange of Technical Information." (December 22, 1987) MIL-STD-1840A is the parent document for the other CALS standards and specifications. It provides rules for organizing files of digital data into a complete deliverable document, using the supporting CALS military specifications.
- MIL-D-28000, "Digital Representation for Communication of Product Data: IGES Application Subsets." (December 22, 1987) MIL-D-28000 defines a series of application-specific subsets of the Initial Graphics Exchange Specification (IGES), the popular name for American National Standard ANSI Y14.26M, "Digital Representation for Communication of Product Definition Data."
- MIL-M-28001A "Markup Requirements and Generic Style Specification for Electronic Printed Output and Exchange of Text." MIL-M-28001A defines standard DoD requirements for automated publishing of page-oriented (i.e., printed) technical manuals and technical orders. It defines a common DoD-wide implementation of International Standard ISO 8879, "Information Processing - Text and Office Systems - Standard Generalized Markup Language (SGML)." This standard incorporates the requirements of MIL-M-38784. The most current information on this evolving standard can be obtained from the NIST CALS support office.
- MIL-D-CGM, "Digital Representation for Communication of Illustration Data: CGM Application Profile." (Draft) MIL-D-CGM defines an application profile for delivery of technical manual illustration using the Computer Graphics Metafile (CGM). CGM has been published as International Standard ISO 8632, American National Standard ANSI X3.122, and Federal Information Processing Standard FIPS 128.

- MIL-R-RASTER, “Requirements for Raster Graphics Representation in Binary Format.” (Draft) MIL-R-RASTER defines engineering drawing and technical manual illustration requirements for raster graphics compressed in accordance with International Standard CCITT T.6, “Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus,” and FED-STD-1065.

The National Institute of Standards and Technology (NIST) has certified ANSI X.12 as a FIPS—Federal Information Processing Standard. As a federal standard, government agencies are directed to use it in the development of their systems. NIST is also working to develop EDI communications interfaces and additional computer standards related to EDI.

DoD and the Department of Commerce have established the National Technical Information Service (NTIS) as the central source for CALS data. The CALS information center has CALS standards, specifications, guides and reports in paper and electronic forms.

Another standard that directly relates to EDI applications is the CCITT X.400 messaging standard. It is based on the Open Systems Interconnection (OSI) model and is soon to be revamped by the recommendations for the X.500 series and with elements directly addressing needed EDI functions. The new standards are expected to broaden the number of E-mail users and expand the market for messaging services and EDI applications. The government X.400 standard for E-mail, as released in GOSIP Version 1, became mandatory for agencies in August, 1991.

In May 1991, CCITT enacted a new specification, X.435, that links X.400 electronic messaging with EDI. The new specification details how EDI documents can be encapsulated as X.400 messages and transmitted via X.400 VANs. The X.435 specification indicates that the new P-EDI protocol should be used for sending EDI documents using the X.400 standard. Early users have indicated that the linkage of X.400 and EDI is ideal. Also under development is a standard that would allow facsimile document to be packetized and transmitted on an X.400-type VAN.

Federal agencies are all aware of the impact of standards and have growing concerns about EC systems compatibility. In the previous study, sixty-two percent of the agency respondents were actively supporting EC standards activities from IST, ISO, and other organizations. Half of the agencies believed that current efforts for standardization have had an impact on their acquisition of, and plans for, EC. This year's survey reinforced the findings that the agencies are still fully aware of the role of GSA and other governmental policy-making agencies in establishing EC standards and guidelines.

INPUT expects standards to operate on two levels. First, EC will promote a framework for the exchange of information:

- Among agencies
- Between agencies and private companies
- Between agencies and other public entities

The second level relates to GOSIP, which, among other things, sets rules for designing computer software. INPUT expects new guidelines from OMB to tie EC and GOSIP together.

However, standards problems will continue. While GSA is using the X.12 standard, DLA uses proprietary protocols for its paperless order processing system. Thus a vendor dealing with both agencies must offer both protocols. The problem becomes worse when still other agencies are considered. The mandate that all systems conform to FIPS 161 within five years is being contested by some agencies.

E

Acquisition Plans and Preferences

1. Future Products and Services

Agencies were asked to identify which EC products and services their agencies/organizations are most likely to acquire through 1996. Exhibit IV-10 shows the percentage that stated a likelihood of purchasing those EC products and services listed. Two-thirds (67%) indicated that they would most likely purchase translation software during that timeframe, and 60% expressed a likelihood of acquiring third-party network services.

Roughly half may use contractor assistance for planning and implementation of systems. A smaller percent specified that their agency would be acquiring security- and encryption-related products. This further confirms the unsettled state of EC security concerns among the government agencies. In time, as more security issues are resolved, the agencies will look to industry to supply them with these products and services in order to preserve the integrity of their EC systems.

2. Selection Criteria

The relative ranking of EC contractor selection criteria is shown in Exhibit IV-11. The proposed technical solution was the primary selection criterion for most agencies. Costs in general continue to be important selection criteria for agencies because of budgetary conflicts encountered on the way to project authorization and funding; life cycle cost was ranked second and initial cost third. Security safeguards are now becoming more highly rated by agencies, while contract type and risk containment procedures were perceived as having lower ratings as selection criteria for EC contracts.

EXHIBIT IV-10

EC Products and Services Most Likely to Be Acquired by Federal Agencies Through FY 1996

Products/Services	Percent of Respondents
Translation software packages	67
Third-party network services	60
Contractor assistance for planning and implementation	53
Applications software	40
Software-driven password security products	40
Data encryption equipment	34
Secure networking products	34
On-line order entry system	27
Other contractor devices for EC	27
Additional operating software	20

EXHIBIT IV-11

Selection Criteria Significance for EC Contractors

Agency Rank	Criterion
1	Proposed technical solution
2	Life cycle cost
3	Initial cost
4	Security safeguards
5	Contract type
6	Risk containment

3. Contract Type Preferences

The agency respondents' preferences for contract types used for acquiring EC products and services are shown in Exhibit IV-12. Federal agencies indicated a clear preference (75%) for fixed-price contracts for EC hardware. Fixed-price contracts were preferred by over 60% of the respondents for acquiring software and support services. Several agencies were not sure which type of contract they would use and chose using a mix of contract types.

EXHIBIT IV-12

Agency Preference for Contract Type for EC Products and Services

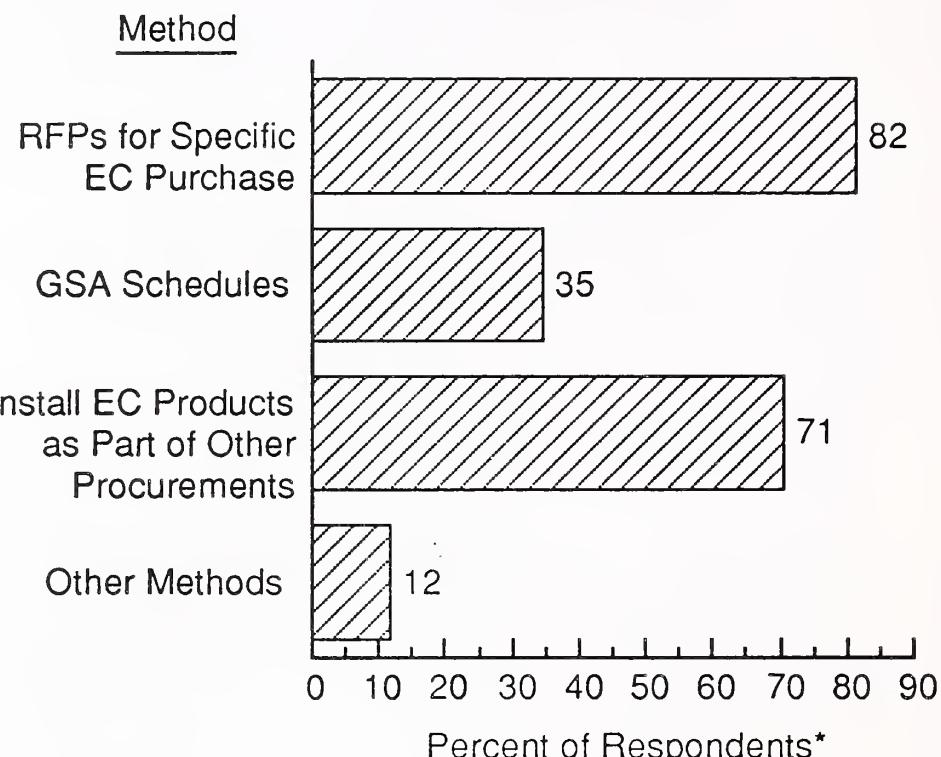
Type Product or Service	Percent		
	Cost-Plus	Fixed-Price	Mix of Contracts
EC Hardware	13	75	12
EC Software	22	67	11
EC Support Services	25	63	12
Other EC Products/Services	12	63	25

4. Method of Acquisition

Agencies were asked to identify the procurement method by which EC products and services are acquired.

- Over 80% of the respondents stated that RFPs for specific EC purchases were used, showing a strict adherence to policies promoting open competition among vendors.
- There was also a high percentage (71%) that use or plan to use the GSA Schedules. The GSA Schedules have expedited the purchasing of microcomputers and software so that agencies have a quicker and easier procurement vehicle to use.
- Roughly one-third of the respondents have installed or plan to install EC products as part of another agency procurement. For example, customers' use of EC, in its Automated Broker Interface (ABI) module, is a key component of the Automated Commercial System (ACS) at U.S. Customs.

EXHIBIT IV-13

Agency Use of Procurement Methods

*Multiple responses

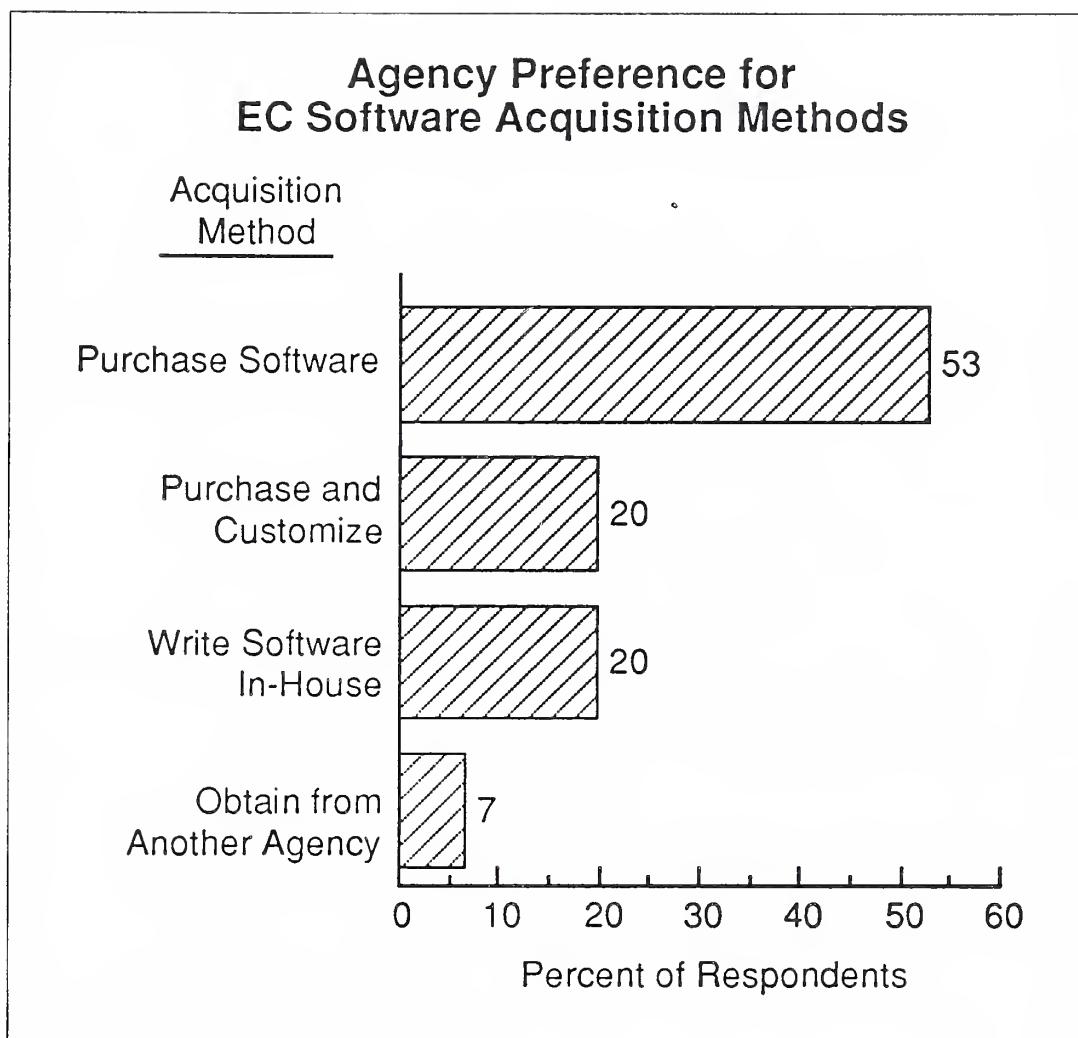
5. Software Acquisition Methods

In developing their EC systems, agencies can either write their own EC software or purchase it. Over fifty percent of the agencies surveyed stated they would purchase the software from a vendor (see Exhibit IV-14). Agencies are still adhering to DoD and civil agency policy by purchasing commercial software. Various OMB and CALS initiatives emphasize reliance on commercial software and services.

- Twenty percent of the agencies stated that they would be purchasing and customizing a software package, most likely because they lack in-house staff and expertise.
- The same percentage (20%) indicated that they would be writing the EC software in-house. This is surprising in view of the growing availability of software packages, budget constraints, and OMB's emphasis on using packaged software.

Vendors with software that is used as part of CALS in LLNL efforts will have a competitive advantage. Other software providers should pursue compliance with these system standards. At minimum, software must comply with FIPS 161.

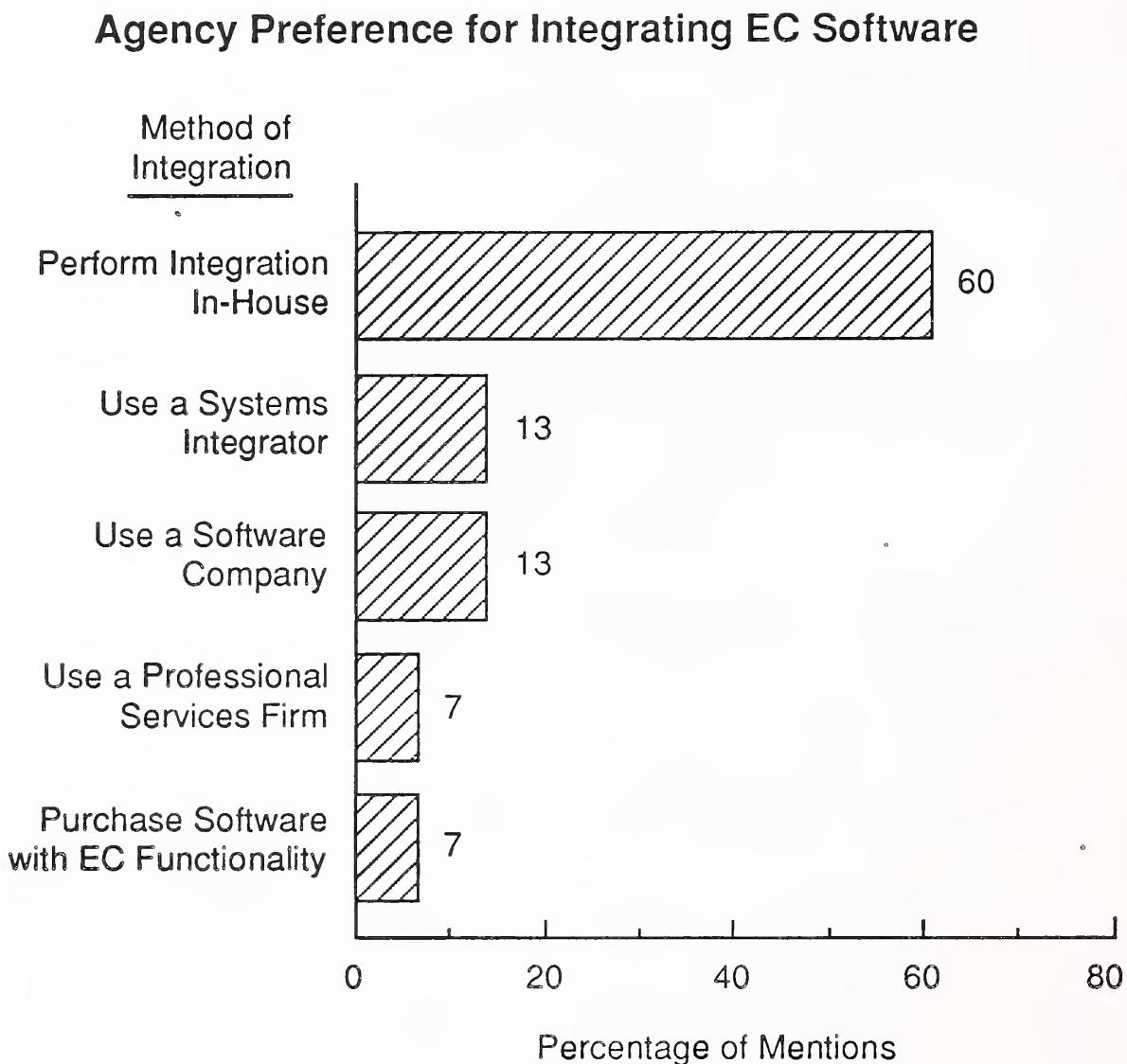
EXHIBIT IV-14



EC software is readily available from many vendors that service the federal marketplace. Most of the vendors INPUT surveyed offered software and software support products to the government. Federal agencies are currently examining these offerings to link their future software to existing applications and major functions, to optimize the software's usefulness.

As shown in Exhibit IV-15, sixty percent stated that the agency preferred to perform the integration in-house. Only 13% indicated a preference for using either a systems integrator or a software company for integration functions. Thus, EC systems will not develop into a large opportunity area for federal systems integration firms, but may in the future be a component of other systems integration programs. An even smaller percentage (7%) indicated a preference to acquire software with EC functionality. These overall preferences indicate a current reluctance by agencies to allocate scarce funds for integration of their planned EC systems.

EXHIBIT IV-15



F

Vendor Performance**1. Agency Satisfaction with Vendors**

The overall satisfaction level of agencies with EC vendors appears to be relatively moderate for all vendor characteristics. All agency ratings are 3.0 or above on a scale of 1 to 5, as shown in Exhibit IV-16.

EXHIBIT IV-16

Level of Federal Agency Satisfaction with EC Vendors



*Tie in rating

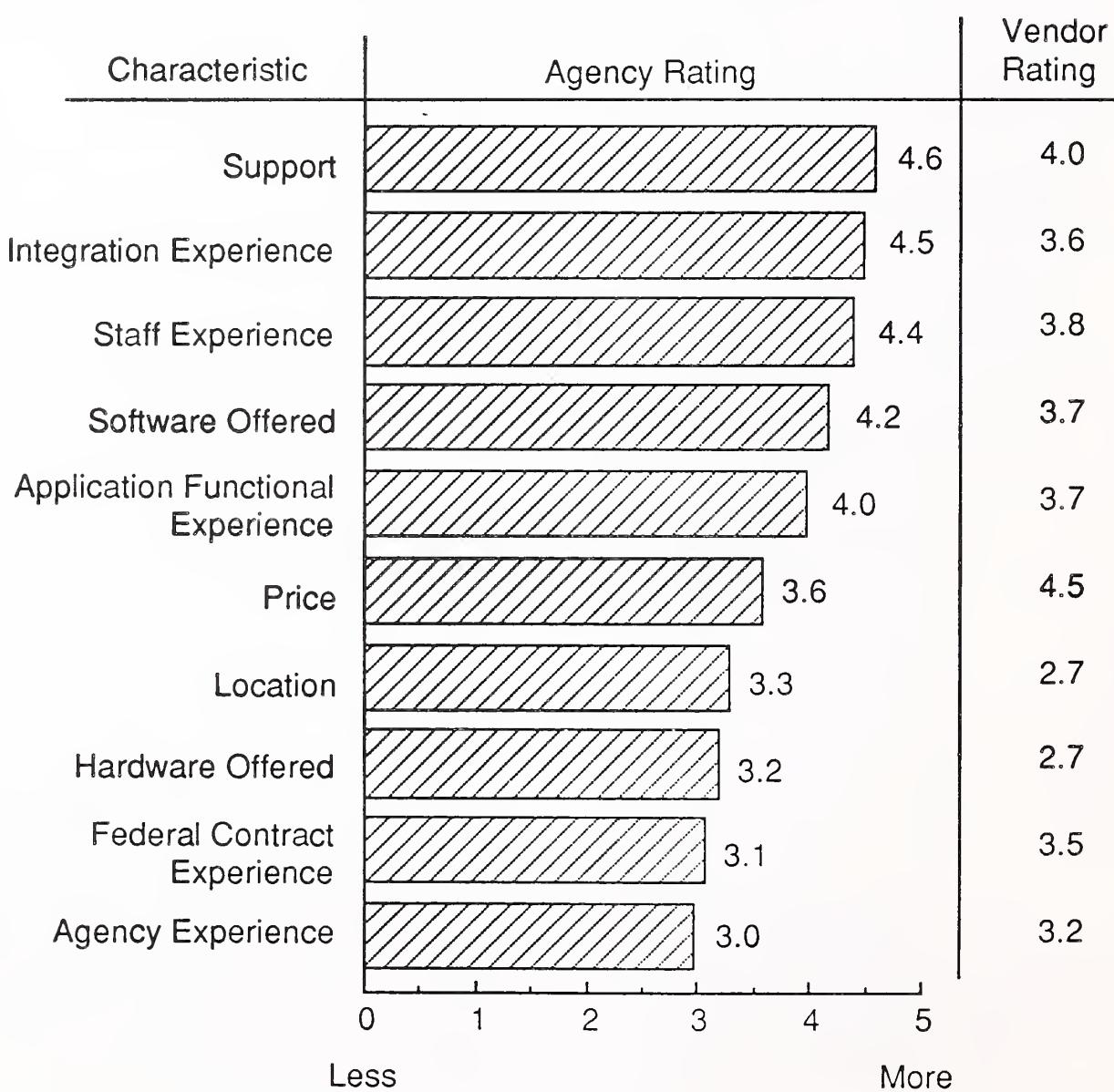
The highest level of satisfaction is with vendors' quality of work. Previously, project management was the most highly rated characteristic. There are minimal differences in agency ratings for most of the other characteristics. This reflects the improved quality of vendor offerings, especially translation software. However, the drop in ratings for project management suggests some implementation problems with recent EC projects.

2. Agency Ratings of Contractor Characteristics

Agencies' opinions on the most important characteristics of a successful contractor differ from vendors'. As shown in Exhibit IV-17, agencies rate support and integration experience as most important, while vendors rank price first and support second. This difference reflects what vendors emphasize in bid preparation. Agency ratings reflect an aversion to risk, which has shown up in previous agency surveys on numerous subjects.

EXHIBIT IV-17

Agency Ratings of the Characteristics of a Successful EC Services Contractor



Vendors' staff experience and application functional experience also received high ratings by agencies because the industry must provide the skills and experience not obtainable in-house. A vendor's reputation for providing skilled personnel, quality integration projects and reliable support is a valuable attribute in gaining additional federal contracts.

3. Suggestions for Improvements to EC Products/Services

Agencies were asked for suggestions on how vendors can make their EC services more valuable to the federal government over the next five years. As should be expected, the replies varied because of the different types and levels of experience agencies have had with vendors, and are also different from the previous findings.

In descending order of frequency of mention, Exhibit IV-18 lists the principal suggestions made by the federal agencies. Increased adherence to standards is now cited most frequently. Agency respondents are required to follow OMB and DoD directives to assure that X.12 and other acceptable standards are incorporated into planned EC systems. This reflects the growing agency perception of the importance of EC standards.

EXHIBIT IV-18

Agency Suggestions for Improvements to EC Vendor Services

Suggestions	Current Rank*	Previous Rank*
Increase adherence to standards	1	4
Increase on-site training	2	-
Increase compatibility of software	3	2
Increase quality of service	4	5
Simplify EC system operations	5	3

*Rank based on frequency of mention by respondents.

The agencies now also suggest that industry vendors increase their on-site training. This implies that vendors need to do more in the area of client support services. As with most technologies new to the federal user, training and support are necessary for agencies to realize the benefits of the technology.

G

Trends

1. Technology Trends Affecting the Federal EC Market

Agencies identified technological factors that could increase agency use of EC systems and services. Exhibit IV-19 lists the most frequently mentioned factors. They identified increased reliability and accessibility of information as the most important factor for increasing EC usage. Further developments in microcomputer capabilities and interoperability of systems will also promote greater utilization of EC at agencies. Technology trends matter to agency personnel in the sense that they facilitate easier or more effective performance of government functions.

EXHIBIT IV-19

Technological Factors Affecting Future Government Use of EC Services

Factor	Rank*
Improved reliability and accessibility of information systems	1
Developments in image scanning	2
Evolution in standards	3
Improvements in transmission devices	4
Developments in software packages	5

*Rank based on frequency of mention.

The agencies are becoming aware of the commercial product developments and improvements to image scanning and transmission devices. The government may want to obtain the advanced technology if and when it becomes cost effective and suitable to their system requirements. The large volume of data handled by the federal government and the need to increase productivity will make advanced image processing and transmission devices important to EC systems planned by government agencies.

In the previous survey, agencies ranked "increased microcomputer capabilities" as the most important factor. This time, that factor was not listed in the top five. This suggests that the faster chips are not relevant to agency personnel, at least in the EC area. Current products appear to fully meet agency EC needs.

Agencies are well aware of the importance of standards to the future growth of EC systems in the government. The attention of agencies regarding standards is currently focusing on the following areas:

- OMB policy
- DoD adoption of CALS
- Federal Supply Service incorporating X.12
- NIST FIPS 161
- GOSIP

Both the OMB and DoD are encouraging the utilization of X.12 standards through their issuance of policy directives and memorandums. The Federal Supply Service's award to GE Information Services could eventually involve nearly 200,000 suppliers to the GSA procurement system. This award may become a powerful driving force in the vendor community.

GOSIP—the Government Open System Interconnection Profile—is a mandatory standard and adheres to X.12. The GOSIP protocol standard has been mandatory since February 1989 and is compulsory for new network products and services acquired by government agencies.

Technological developments in software packages will also spur the EC federal market. Government agencies are directed to purchase commercial off-the-shelf software whenever possible. Therefore, increased capabilities of software packages will be important to the government if they are cost-effective alternatives to customized efforts. CALS and LLNL are using commercial software wherever possible.

2. Industry Trends Affecting the Federal EC Market

Agencies identified industry trends or factors that would affect the government's future acquisitions of EC systems and services. The various factors mentioned have been combined into four major categories, as shown in Exhibit IV-20.

EXHIBIT IV-20

Industry Factors Affecting Future Government Plans for EC Services

Factor	Rank*
Consolidation of private and government standards	1
Improvement in quality and variety of products	2
Increased use by exporters/shippers	3
Security concerns regarding access to data	4

*Rank based on frequency of mention.

Most identified consolidation of private and government standards as the largest influence on the marketplace. Establishment of additional X.12 translation sets that incorporate features from the industry-specific standards will ease the adaptation of EC techniques in government and speed the growth of trading partners. Furthermore, there is considerable pressure to standardize in response to government policy directives.

Several agencies offered the opinion that industry's improvement in the quality and variety of EC products has gained support for utilization of EC systems throughout the government. Many of the product advancements have been carried over from successful commercial implementations.

The successful government implementation of EC for transportation documents by exporters and shippers has also sparked the attention and interest of other agencies as they plan for future EC development. The shipment of goods and services to and from agencies requires a long and complex paper trail. EC can make the process of handling shipping documents less expensive, faster, more efficient, and more responsive to the agencies and companies involved.

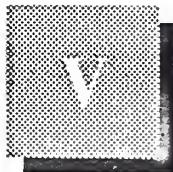
Agencies were also mindful that security directives and congressional concerns regarding data access would significantly affect future government EC plans. Future EC systems must comply with evolving security standards as mandated by the Computer Security Act. However, many of the standards remain, at this writing, largely undefined. Therefore, EC security requirements will continue to evolve for the foreseeable future.

3. Budgetary Constraints

Fifty-eight percent of the agencies surveyed have experienced some effects of the federal government's budgetary constraints. On the negative side, agencies reported that budgetary constraints have slowed down new EC initiatives. Also, there is a shortage of funding for staffing, VANs, software and consulting services.

Furthermore, some agencies continue to comment on the additional complexities of having to justify administrative decisions for EC program development. There is a greater requirement for the analysis of the risks involved with EC when budgets are undergoing closer scrutiny.

On the positive side, budgetary constraints have prompted some agencies to develop EC programs as a means of reducing costs and being more efficient in their resource usage. Some agency respondents were of the opinion that the government is already proceeding to combine applications on larger systems to achieve greater cost savings.



Competitive Trends

A

Vendor Participation

1. Vendor Products and Services

Vendors that compete in the federal EC market offer a wide range of products and services. Exhibit V-1 shows the products and services that vendors currently provide to the federal agencies, as well as those anticipated over the next five years.

The largest percentage of the companies surveyed are currently offering custom software and consulting services to federal agencies. Over the next two to five years, more companies expect to offer these same services. The percentage of companies offering standard software and systems integration services will increase over the next few years as EC systems progress in development. As the federal EC marketplace continues to grow, new approaches are being taken by vendors seeking to differentiate their offerings in an increasingly competitive marketplace.

2. Applications Supported by Vendors' EC Products and Services

The vendors were queried on which applications their EC products and services will initially support or plan to support in the future at federal agencies. As might be expected, purchase orders, cost quotes and procurement functions were the most frequent replies. The applications supported by the vendors as listed in Exhibit V-2 differ somewhat from those cited by the agency respondents. Payments, invoices, and data transfer were mentioned more frequently by the agencies. The differences suggest, at least to a limited extent, that suppliers are not properly focusing their offerings or are not fully communicating with agencies to assess their requirements. This is to be expected when there are so many relatively small pockets of EC activity.

EXHIBIT V-1

Types of EC Products and Services Provided

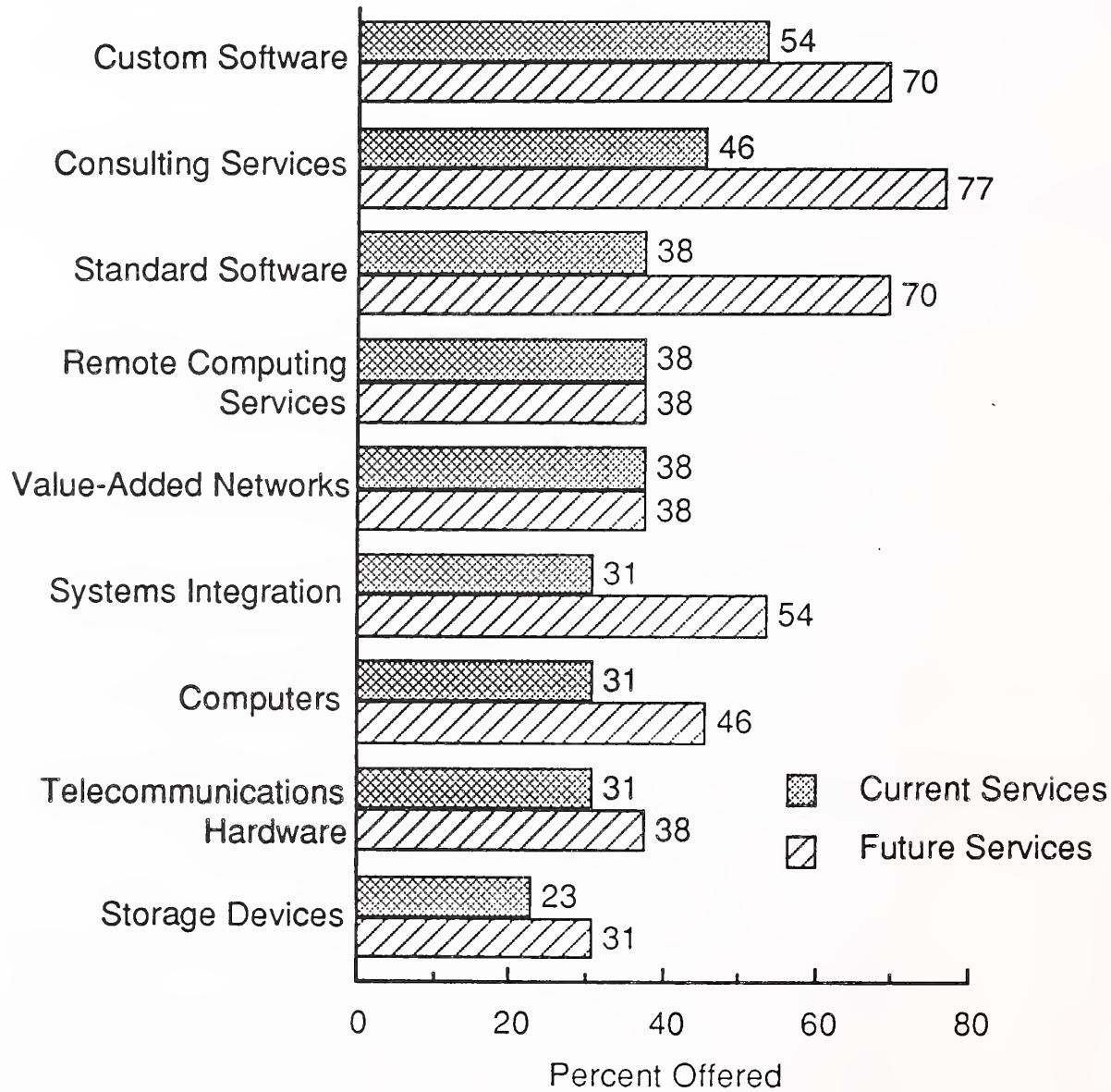
Products/Services

EXHIBIT V-2

Applications Supported by EC Vendors in the Federal Market

Application	Percentage of Industry Respondents	
	Current	Future
Purchase Orders	54	85
Cost Quotes	40	50
Procurement Functions	36	72
Ordering/Solicitations	25	75
Administrative Messages	18	27
Data Transfers	15	38
Invoices	10	50
Transportation Functions	9	54
Bills of Lading	-	50
Financial	-	50
Electronic Funds Transfer	-	40
Payments	-	40
Distribution	-	20
Requirements Data Base	-	20
Inventory	-	20
Personnel/Human Resources	-	10
Collections	-	10

In the future, EC vendors anticipate support of more procurement-related applications. These additional applications will evolve as the integration of various applications occurs and advancements in software are implemented. For example, ACS Network Systems of Concord, California has introduced a series of products aimed primarily at the federal market. These products are intended to support primarily the translation and communications functions for midsize IBM computers. IBM has also introduced a family of EDI software products, with the unlikely name of XPEDITE. IBM has also unveiled a CALS application suite targeting the SGML electronic document elements.

After winning an \$841 million contract award for minicomputers, workstations and microcomputers at the U.S. State Department that contained some electronic commerce components, Wang is targeting the EC market. It has announced a UNIX CALS workstation conforming to SGML for \$20,000. The workstation also will allow users to convert documents already in Wang VS or OIS into CALS/CE format and communicate via TCP/IP. Other agencies are expected to use the State Department contract. Wang is continuing to develop CALS-compliant products.

Valid Logic has announced a circuit board, called CALS-OUT, that automatically generates release and process documentation to meet CALS standards. CAD drawings are automatically generated in the CALS format.

Additional CALS-compliant publishing products have been announced by Digital, Arbortext, GTX, Sherpa, Xerox, Interleaf, Avalanche, Taunton Engineering, US Lynx, SoftQuad, Yard and Rosetta Technologies.

B

Market Issues

1. Vendor Concerns

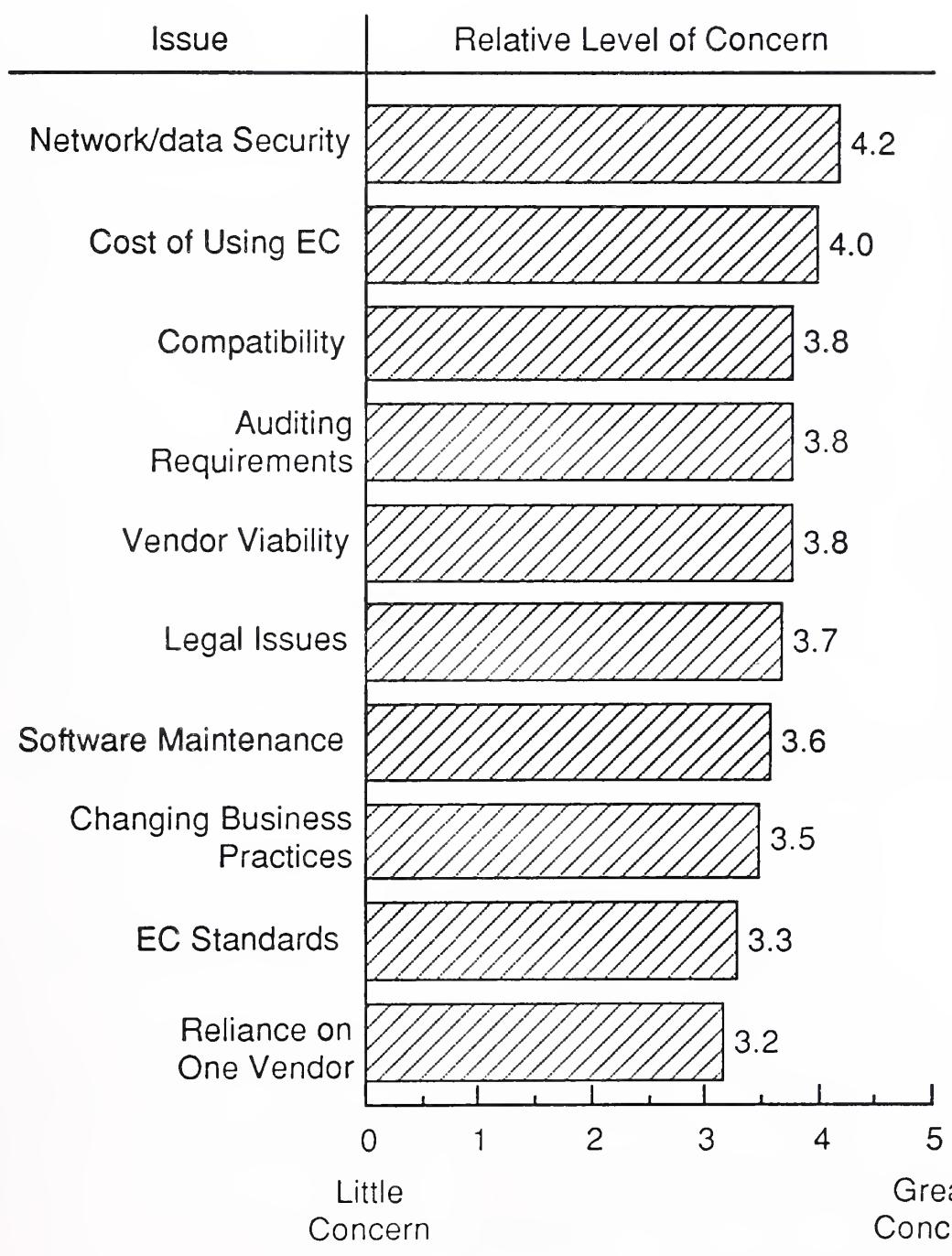
Federal EC vendors have expressed the highest level of concern over security issues, as shown in Exhibit V-3. In many respects, the government tends to be a more demanding buyer than its commercial counterparts. The government requests more information on costs, suppliers, staffing practices, and a variety of other matters. Without adequate safeguards, suppliers to federal agencies fear that some agencies might abuse EC technology to gather excessive company information. This issue will have to be sorted out before EC can make significant headway.

Another major concern to vendors is the cost of using EC. For many suppliers/companies, the cost of establishing an EC system is a large investment. The SEC, in its formulation of guidelines for electronic filing by small companies, is requiring full compliance except for hardship

cases. The SBA has been directed to study the impact of EC on small businesses. Additionally, government agencies, like SEC and GSA, are recouping the costs of their EC systems by directly or indirectly transferring costs to the commercial users.

EXHIBIT V-3

Level of Vendor Concern With EC Issues



Compatibility, auditing requirements and vendor viability all received the same relatively high rating for level of concern by the vendors. The agencies differed in their ratings of these same concerns, as shown previously in Exhibit IV-8. Security still received a high rating by the agencies. However, software maintenance and legal issues were rated notably higher in level of concern by the agencies. Again, this reflects some differences in perspective between agencies and vendors. Agencies, just as most commercial users, are usually more concerned about support than are vendors.

2. Advantages/Disadvantages in the Federal EC Market

Vendors had wide-ranging opinions on the advantages and disadvantages of competing in the federal EC market. Their responses are summarized in Exhibit V-4. The federal government's knowledge of commercial EC practices is one of the advantages. Also, the federal market appears to be a large potential market without many restrictive sole-source buys. Furthermore, the federal government is developing into an experimental environment in which vendors are gaining experience in providing customized solutions to EC system requirements and addressing very large-scale applications.

Vendors' views of the disadvantages or liabilities of this segment also span a wide range of opinions; therefore, they are not ranked. One of the most frequently mentioned problems was the necessity to adhere to complex procurement regulations. Vendors also noted that the federal market is slower to mature. In addition, vendors expressed their frustration in trying to contend with a lack of approved documents and compliance with competing standards. In general, vendors view federal EC as lagging behind the commercial market, a perception INPUT shares. However, when it does mature, the federal market should prove very profitable for some EC vendors.

3. Differences Between Commercial and Federal EC Markets

Exhibit V-5 presents the industry respondents' opinions on the differences between the commercial and federal EC markets. The majority of respondents noted the slowness of the federal market to develop in comparison to the quickening pace of the commercial sector. As indicated earlier, federal EC activities lag behind those of the commercial market. The second most noted difference was the greater emphasis by federal agencies on security requirements. Regulations by the DoD and other restrictions imposed by the Computer Security Act are the cause of this heightened awareness of security by the government agencies. The other differences cited by the vendors are common to all information systems implemented by the government, not just EC.

EXHIBIT V-4

Vendor Perceptions of the Federal EC Market

- Advantages
 - Commercial knowledge
 - Potential business
 - Willingness to experiment
 - Government directives
 - Narrow contacts field
- Disadvantages
 - Procurement regulations
 - Slowly maturing market
 - Lack of approved documents
 - Auditing requirements
 - Lengthy cycle
 - Competing standards

EXHIBIT V-5

Government Versus Commercial Market Differences in EC Products and Services

Market Differences		Rank*
Federal Market	Commercial Market	
Government slower to develop EC systems	Industry faster to implement EC	1
Greater emphasis on security requirements	Fewer security issues	2
Lengthy and complex procurement process	Shorter buying cycle and less regulation	3
Large volume of paper documents	Smaller volume of documents	4
Lack of profit motive	Strong profit motive	5

*Rank based on frequency of mention.

Vendors gave several reasons why these differences exist. Clearly, the nature of the federal government differs from that of commercial clients. Also, the federal marketplace has more regulatory and legislative constraints than the private sector. Lastly, the difference in magnitude of projects in the two markets is viewed as adding complexity in marketing to the federal government.

Vendors have expressed a wide difference of opinion on the importance of price in the federal marketplace. INPUT expects that vendors who do not control government marketing and product costs and do not offer government discounts will have serious difficulty penetrating the federal market.

While many of the other factors were restated in a slightly different fashion, the mention of profit motive was new. This suggests that vendors doubt the importance of cost savings in implementing EC. This again differs from INPUT's observations, which show many agencies to be highly cost conscious. EC systems must be cost justified and represent substantial cost savings to the government.

4. Impact of the Commercial Sector on the Federal Market

Industry respondents were asked to identify what they perceive as the impact of developments in the commercial EC segment on the federal EC market. The responses are compiled in Exhibit V-6. Based on frequency of mention, the most frequently perceived impacts were increased cost effectiveness and ease of government implementation. Many vendors also noted that commercial developments have stimulated increased interest in EC by the agencies.

Some vendors stated that there really has been a minimal amount of impact to date, but the impact will increase as standard formats are adopted. Overall, the consensus of the industry was that the government has benefited from industry activities. The benefits will continue as many industry vendors and associations work together in the commercial sector, then bring the resulting EC advancements to their federal government clients.

EXHIBIT V-6

Vendor Views of Impact of Commercial EC on the Federal Market

Impact	Rank*
Increased cost effectiveness of government implementation	1
Improved ease of government implementation	2
Increased agency interest in EC	3
Minimal impact until format standardized	4
Government benefits from industry activities	5

*Based on frequency of mention.

5. Vendor Perceptions of Agency Opportunities

EC vendors differ in their opinions as to which agencies provide the most attractive opportunities for their present services marketed to the federal government. Most vendors serve both the DoD and civil agencies. Some vendors have expanded their federal government marketing to the defense agencies. Exhibit V-7 lists the most frequent department and agency

targets of the industry respondents and are listed without any preference or ranking. These targeted agencies include Treasury, GSA, Veterans, DLA and Army among others. Agency opportunities are discussed in Chapters IV and VI.

EXHIBIT V-7

Vendor Perception of Agency Opportunities for EC Products and Services

DoD Agencies	Civilian Agencies
Army	Treasury
Air Force	GSA
Navy	VA
DLA	NASA
Marines	Commerce
	Agriculture
	HHS

Many federal vendors are leveraging their commercial experience and skills in similar applications and EC systems for federal agencies. Examples include the petroleum/fuels, transportation, and payment systems developed by vendors for both the commercial sector and government. Industry respondents noted that in some cases EC products are generic and can be utilized quite easily in any marketplace.

C

Vendor Selection

1. Selection Criteria

Vendors must understand and respond to the criteria used by the government to select a winning vendor for an EC system. As shown in Exhibit V-8, vendor respondents considered the proposed technical solution the number-one selection criterion, and the initial cost of the project second. Agency respondents ranked the proposed technical solution first and life cycle cost second.

EXHIBIT V-8

Vendor Perception of the Relative Importance of Contractor Selection Criteria to Federal Agencies

Selection Criteria	Current Vendor Ranking*	Previous Vendor Ranking*
Proposed technical solution	1	2
Initial cost	2	3
Life cycle cost	3	1
Contract type	4	-
Risk containment procedures	5	4

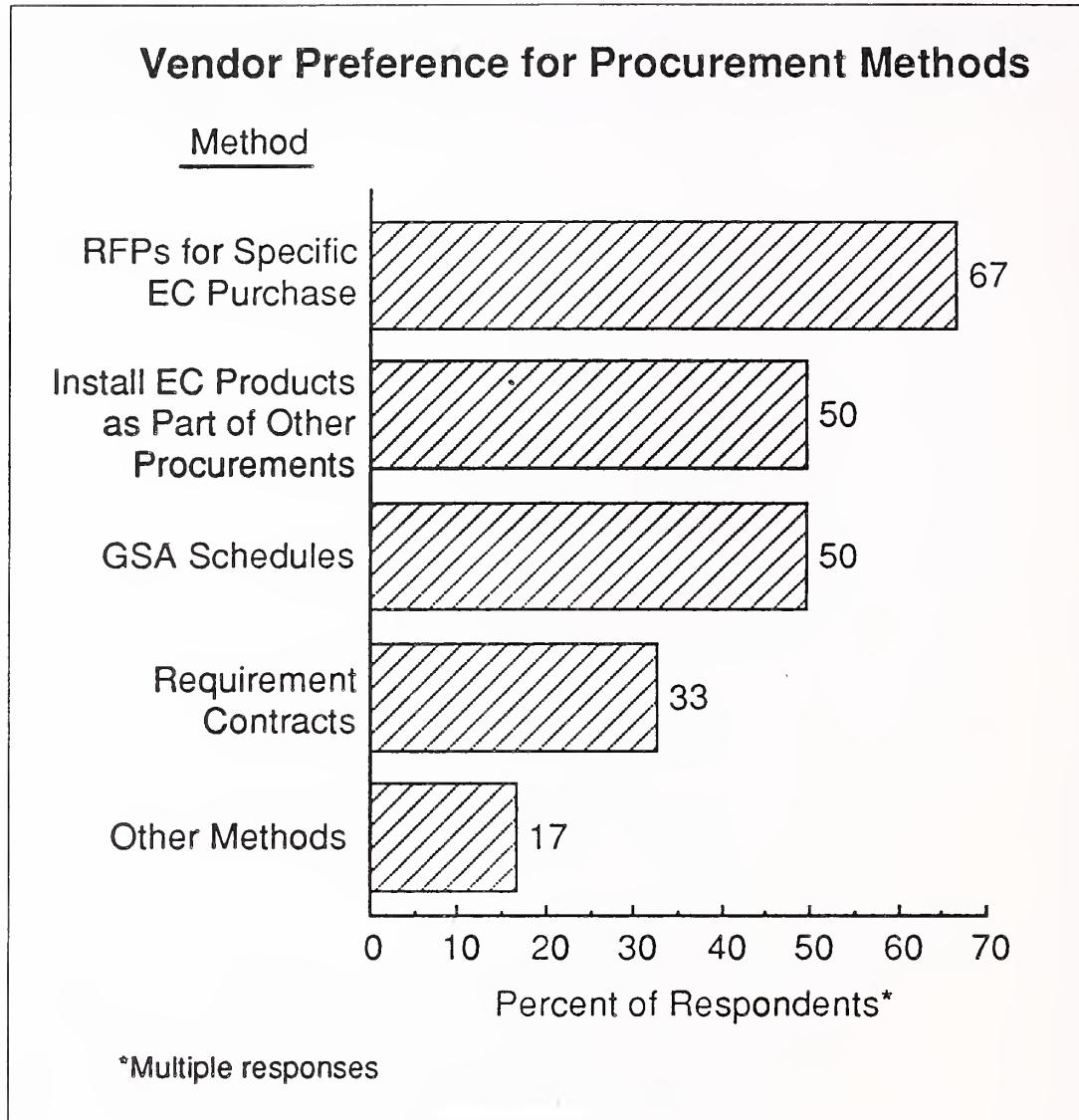
*Rank based on average of ranking.

Since the 1987 INPUT study, vendors have changed their perceptions of which selection criteria are most important to federal agencies. As shown in Exhibit V-8, vendors now believe that the government evaluation emphasizes obtaining technology to improve operations, rather than weighing the life cycle cost most. INPUT has found little evidence of this. Rather, two major awards, by GSA and the SEC, appeared to emphasize costs. Only in major developmental projects like CALS will the technical solution be a dominant factor.

2. Vendor Preferences for Procurement Methods

Vendors were queried on which procurement method they prefer to respond to for marketing their EC products and services to the federal government (see Exhibit V-9). The majority (68%) of industry respondents prefer RFPs for their specific EC products. Half of the respondents use both the GSA Schedules and also install EC products and services as part of other procurements. At present, there are very few requirements contracts for EC products.

EXHIBIT V-9



3. Preferred Contract Type

As shown in Exhibit V-10, vendors generally prefer fixed-price contracts for EC hardware, software and support services. The vendors previously had a fairly low preference for fixed-price contracts in contrast with the agencies' preference for this type of contract. However, vendor movement toward increased use of fixed-price contracts has been noted. This reflects two trends: first, many commercial-oriented vendors have to recognize the necessity of fixed price in federal contracts, and second, with Congress and GSA limiting the profitability of time and materials contracts, vendors now recognize the greater profit potential of fixed-price contracts.

EXHIBIT V-10

Vendor Preference for Contract Type for EC Products and Services

Type Product or Service	Percent Respondents		
	Cost-Plus	Fixed-Price	Mix of Contracts
EC Hardware	14	57	29
EC Software	10	50	40
EC Support Services	27	46	27
Other EC Products/Services	40	20	40

4. Preferred Integration Method

Vendors were asked to specify which method of integrating EC software with other agency applications was preferred for government agencies. Nearly half (46%) viewed the use of systems integrators as most preferable. Many of these vendors are planning to offer systems integration services themselves in the future.

Twenty-three percent noted that integration was dependent upon the system and should be decided on a case-by-case basis, rather than generalizing about which method is best suited to all government agencies. Another 23% held the view that federal agencies are integrating EC software with other applications themselves. This suggests a more limited outlook for future opportunities. Lastly, only eight percent of the vendors found it favorable for software companies to undertake the integration. By the time another survey is completed, vendors will likely have a clearer view of agency practices.

D

Teaming Patterns

Teaming efforts in the federal market are often essential in order to respond to many of the agency RFP's. Most vendors view their teaming relationships as successful. Exhibit V-11 lists the vendor types cited by the industry respondents as their most frequent teaming partners. Also, because EC is often part of a larger procurement, subcontracting could be a necessity.

EXHIBIT V-11

Teaming Partners for Federal EC Contracts

Vendor Type	Rank*
Software Manufacturers	1**
Systems Integrators	1**
Hardware Vendors	3
Professional Services Firms	4**
Aerospace Divisions	4**
Value-Added Network Providers	6
8 (a) Firms	7

*Based on frequency of mention by industry respondents.

**Tie in ranking

Software manufacturers and systems integrators tied in frequency of mention as team members. They are a logical choice for the match of skills and resources required for many federal EC projects. A close third place for mention as a partner was hardware vendors. Another tie occurred between professional services and aerospace divisions. These types of companies are becoming stronger players in the EC market. INPUT found the mention of hardware vendors somewhat surprising, since these vendors, as a group, have shown little interest in the EC market. Digital is an obvious exception. As the size and complexity of EC systems has grown, hardware vendors see more opportunity. CALS especially represents substantial equipment requirements and opportunity.

In previous INPUT studies of teaming among federal vendors, industry respondents recognized the need for more cooperation and communication with their teaming partners. Vendors also noted their own shortcomings in not fully identifying all the requirements of a program early enough in the planning process. If such shortcomings are overcome by EC vendors, this better planning could aid in developing teams of companies that are more suitably matched.

In their previous suggestions, industry respondents also mentioned the need to improve the marketing of their team members' products, as well as increasing their reliance on standard products. In addition, efforts should focus on improving delivery schedules and product prices. Again, these suggestions are relevant to the EC market.

Teaming patterns may advance the technology level in the federal EC market. Through vigorous product development and understanding of the government's operational requirements, successful vendor teams can work toward migrating the federal agencies to a "paperless environment." Though INPUT does not expect any agencies to achieve this completely, much progress can be made in that direction.

A strong teaming effort and a thorough analysis of the electronic information needs of a federal agency resulted in a team led by BDM International being awarded the \$52 million contract for the SEC's Electronic Data Gathering Analysis and Retrieval (EDGAR) system. The team members included Mead Data Central, Bechtel Information Systems, and Sorg Inc.

The SEC system is to be used for electronic filing of corporate documents and it must support 500 users simultaneously. Each company brought to the team a range of relevant skills and agency knowledge that allowed the team to successfully meet the EDGAR requirements.

Each company had earlier close business dealings among themselves before teaming in response to the SEC RFP. Together they were able to propose a more cost-effective superminicomputer-based system with a smaller architecture than was expected by the SEC.

It was recently announced that GE Information Services will increase teaming with systems integration (SI) vendors to sell its EDI products. GE has announced relationships with EDS (fairly new), and Honeywell Federal Systems, Inc., a relationship that dates back nearly 20 years, when Honeywell acquired GE's computer business. On the GSA contract, Honeywell (now HFSI) assisted in the integration of GE's EDI products onto Honeywell equipment at GSA.

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The larger, more integrated and complex a project is, the more likely teaming will be necessary. Even industry giants such as EDS, CSC and Xerox will require teammates with specific, unique EC products and skills. The complex cooperation involved in the CALS teams provides a very good example.

E

Vendor Performance

1. Satisfaction Level Perceptions

Vendors were asked their opinions of the level of satisfaction of government agencies with the past and present performance by EC service contractors. The results are presented in Exhibit V-12. Agency responses were shown earlier in Exhibit V-17 and were slightly higher overall.

Vendors believe agencies are somewhat satisfied with the cost of EC products and services, responsiveness to agency needs, and project management. Satisfaction levels reported by the agencies themselves were highest for quality of work, followed by development visibility. Vendors and agencies both rated delivery schedules as an area of low satisfaction.

EXHIBIT V-12

Vendor-Perceived Level of Government Agency Satisfaction with EC Services Contractors

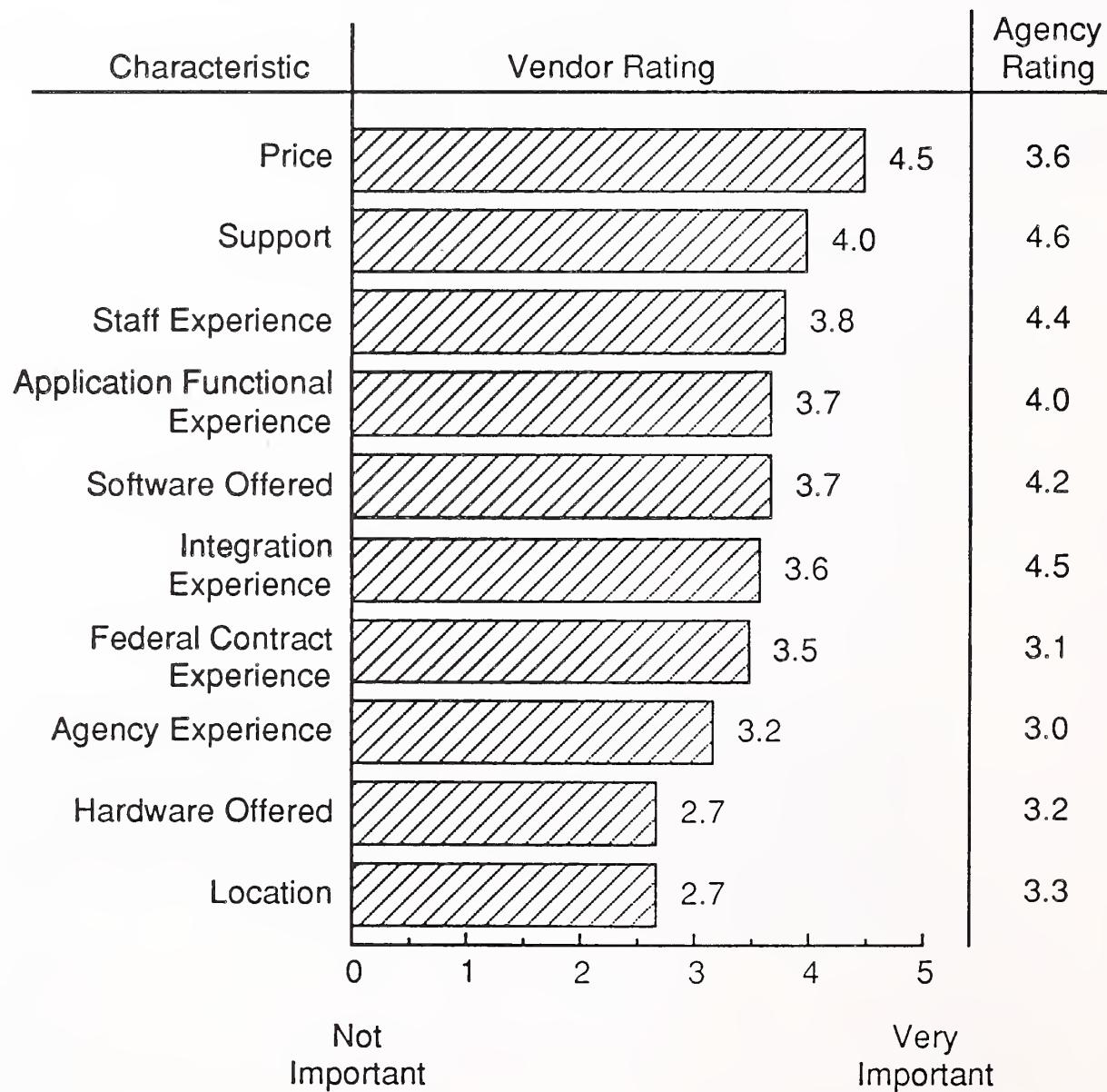
In most categories, ratings were reduced dramatically from the earlier survey. Responsiveness went down from 4.9 to 3.0, and quality from 4.8 to 2.8. This suggests that vendor respondents have started having trouble with their agency customers. This may reflect inflated expectations on the part of the customers or the difficulty in moving a system from a pilot to full-scale implementation.

2. Characteristics of a Successful Contractor

Vendors also had different views from the agencies regarding the relative importance of characteristics in winning a bid with government agencies. As shown in Exhibit V-13, vendors ranked price, support, and staff experience as the most important characteristics. The agencies, however, also included integration experience as an important characteristic. Agency experience and location were rated as less important characteristics by both vendors and agencies.

EXHIBIT V-13

Vendor Perception of the Relative Importance of Vendor Characteristics to Federal Agencies

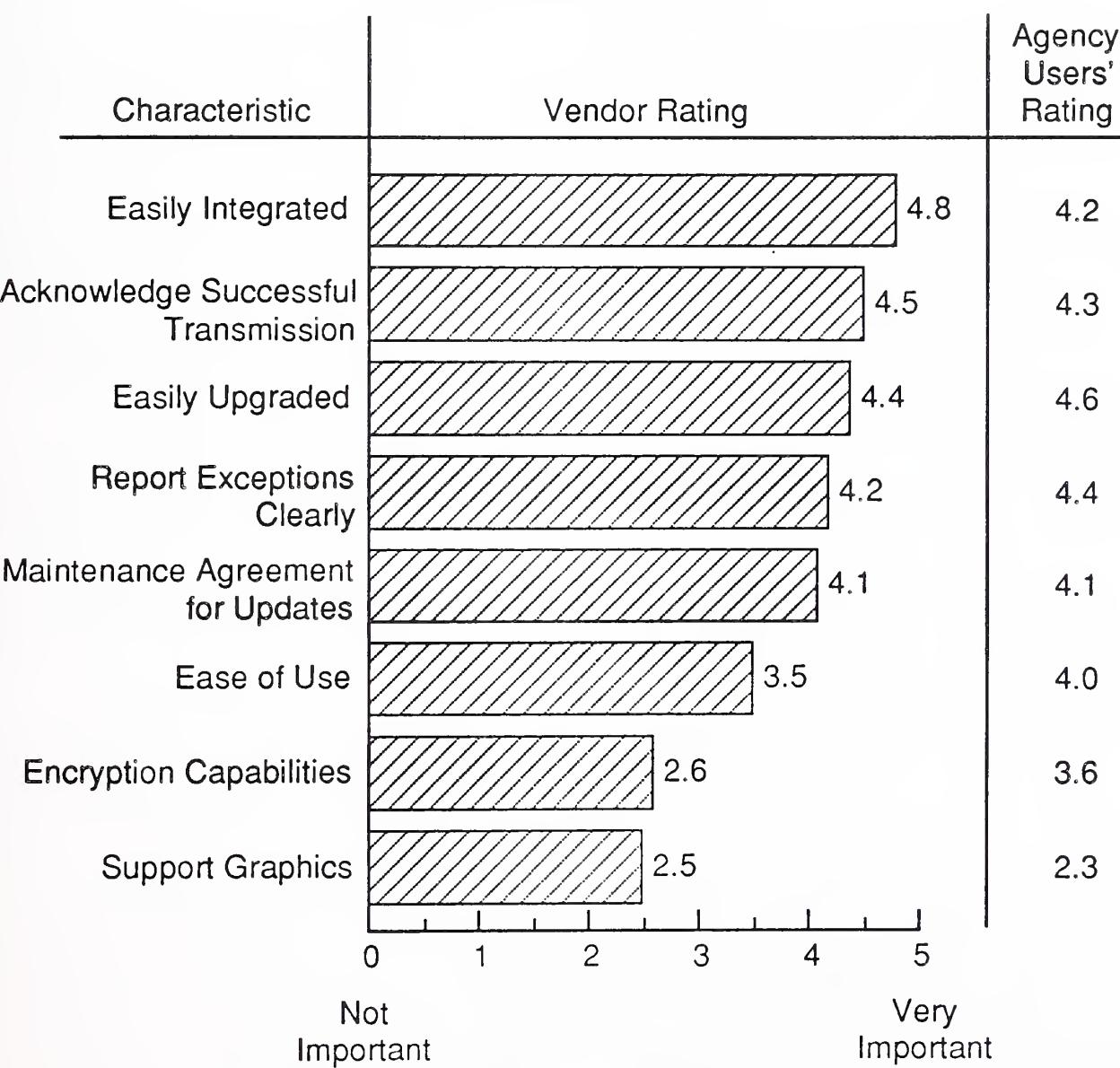


3. Importance of Software Features

Vendors from a cross-section of the EC industry rated the relative importance they placed on a variety of EC software features. Exhibit V-14 shows the responses. These features were also rated by federal agencies for comparative purposes.

EXHIBIT V-14

Vendor Rating of Importance of EC Software Features



Ease of integration was deemed the most important by industry, but was only of middling importance to agencies. Vendors also gave higher than average ranking to the acknowledgement of transmissions and upgrading features of the software. These two features are currently assessed as more important than security and graphics, but may change in ratings of importance in the future.

Vendors have remained fairly consistent in their views on software features. INPUT found this somewhat surprising, since EC software functionality has changed considerably. Normally, this would drive up user expectations and demand for still greater functionality. Apparently the pace of software development and enhancement is keeping up with changes and expectations.

4. Suggested Improvements to Products and Services

Industry respondents were asked what they believed vendors need to do over the next five years to make their EC products and services more valuable to the federal government. The replies varied because of the different types and levels of vendor experience with federal agencies.

In descending order of frequency of mention, Exhibit V-15 lists these suggestions. Improved adherence to standards was cited most frequently as a means of making vendor services more valuable. The agency respondents also made this suggestion most frequently as an area of improvement.

EXHIBIT V-15

Suggested Improvements to Products and Services

Suggestion	Rank*
Improve adherence to standards	1
Improve quality and capabilities of software	2
Improve interconnection capabilities	3
Develop "error-free" communication protocols	4
Improve document transmission acknowledgment techniques	5
Expand portability capabilities	6

*Rank based on frequency of mention.

Agency and industry respondents were also in agreement on the need to improve software capabilities. The other suggestions made by the industry respondents reflect improvements that enhance the specific operation of an EC system, i.e., improved interconnections, portability, and protocols.

Vendor responses had changed considerably from the previous survey. Interconnection capabilities moved from 1 to 3, and several other suggestions dropped off the list completely:

- Increase availability of translation software
- Increase on-line E-mail capabilities
- Expand E-mail capabilities

Their non-appearance on this list implies that these earlier vendor suggestions have largely been realized. Increased functionality of EC software has reduced the need for improvement in these areas. In a sense, the vendors are catching up with user demand.

F

Trends

1. Industry Trends Affecting the Federal EC Market

Vendors surveyed by INPUT suggested numerous industry factors that could impact federal EC products and services marketing over the next two to five years. INPUT grouped these factors into the five categories most frequently cited and presents them in Exhibit V-16.

The factor with the greatest consensus among the vendors is the increase in trading partners. A steadily growing number of large suppliers to the government are becoming EC trading partners in order to remain competitive in the market. Previously, vendors had expressed concern about the overall impact of the implementation of EC on small businesses. However, INPUT expects that most vendors, including small businesses, will be able to accommodate federal EC requirements.

Other vendors commented on developments in the international standards and systems arena as impacting future revenues. Many large companies that are active in EC are participants in both the federal and international business worlds and would like to see greater unity of standards. Much progress is already being made in the use of EDIFACT for the exchange of international customs documents in air and ocean shipping activities—on a pilot basis. Software companies are also working on PC software to effectively support EDIFACT data formats. However, as already pointed out, EDIFACT is inconsistent in some respects with X.12.

EXHIBIT V-16

Vendor Ranking of Industry Factors Affecting the Federal EC Market

Factor	Rank*
Increase in trading partners	1
International development of standards and systems	2
Banking and security requirements	3
Industry shake-out of vendors	4
Trend toward paperless business practices	5

*Rank based on frequency of mention.

Another factor mentioned centers on banking and security requirements. Vendors are hopeful that government directives regarding security and financial transactions will foster growth for the EDI and EFT industry.

Network security represents a particular concern for federal EC applications. Certain user friendly characteristics may, while increasing user acceptance, damage security. Some suggested user hostile features include:

- Avoid naming the organization
- Do not identify the hardware
- Do not provide an access help screen
- Do not prompt for user name, ID, and password separately

As EC matures in the federal government, INPUT expects security concerns to become more pronounced.

Vendors also noted the possibility of an industry shake-out. The industry concerns center on industry competitiveness. The potential for mergers of value-added carriers with smaller software companies represented a related issue. This trend may become more pronounced in the federal sector. Many federal buys cover a wide variety of products and services, classified as systems integration (SI). Most EC firms would not bid for these on their own, but would participate as a teaming partner. Frequent teaming often leads to more permanent mergers and acquisitions.

The industry trend of migrating toward paperless business practices will affect the federal marketplace. Commercial EC developments that provide cost-effective techniques of conducting business transactions may eventually be utilized by federal agencies as they progress in their planning and design of EC systems. Just-in-time inventory is noted as an emerging trend in this area. Various government policy directives will also continue to encourage the establishment of paperless environments.

Vendors were also mindful of the effect that GSA's FTS 2000 may have on various segments of the EC industry. Many respondents view FTS 2000 as a possible hindrance to extending the use of VANs at agencies. In addition, concerns were expressed that some EC services may be transferred to RBOCs, especially over the ISDN. However, the government's EC systems also focus on other application areas and have a large number of trading partners that are not presently subject to the jurisdiction of the FTS 2000 system, nor included in systems interconnection with other agencies.

2. Technology Trends Affecting the Federal EC Market

Vendor respondents were asked to identify technological factors that would alter the federal government's requirements for EC products and services. The factors named most frequently are listed in Exhibit V-17.

EXHIBIT V-17

Vendor Ranking of Technological Factors Affecting Government Requirements for EC Services

Factor	Rank*
Developments in communications devices	1
Evolution of X.400 standard	2
Improvements in computer speed and capacity	3
Advancements in automation	4
Developments in graphic capabilities	5
Developments in encryption techniques	6

*Rank based on frequency of mention.

Developments in communications devices were most frequently cited by vendors as having a strong impact on future EC systems and services. Most progress in communications equipment is coming about due to the efforts of the leading suppliers in attempting to meet government specifications.

Other factors mentioned include evolutionary standards and technical developments in messaging and graphics. Vendors require these standards to develop software applications to meet a widening range of procurement, financial, and scientific needs for transmission of governmental data. The date requirements include a large volume of fiscal, statistical and survey data. Developments in graphics associated with EC may evolve more readily with future implementation of the CALS program.

Vendors also identified future technological improvements in computer speed and capabilities, along with advancements in automation as impacting EC. The government is acquiring newer models of microcomputers and additional local-area networks (LANs) that will have the increased computing power and capacity for development into EC systems. Furthermore, some of the government's computer systems, both existing and future, will require encryption techniques in light of federal agencies' growing need for computer security.

Vendors viewed these technological trends as having a favorable impact on the federal EC market. The advancements in technology would expand agency requirements and applications, foster standardization, and improve accessibility of data. Also noted was the future need for upgrading agency EC systems with increased computer capabilities and possibly migrating to a midrange platform in some cases.

Two factors from the last report failed to appear in this survey:

- Improvements in storage devices
- Developments in computer networks

As in earlier cases, this likely reflects the market catching up with user expectations.

3. Budgetary Constraints

In a separate question, vendors were queried on whether federal government budgetary constraints have any impact on EC procurements. The government's budgetary regulations and procurement policies were viewed by vendors as having a varying degree of impact on the federal marketplace. Budget cuts and changes in authorization and appropriations would influence agency EC acquisitions. Agency procurement policies,

especially DoD policies, could either positively or negatively affect EC systems and are viewed by industry as policy considerations instead of budgetary considerations. This industry ambivalence reflects the general level of uncertainty on the part of the vendors.

EC is expected to be used more as a cost saving measure in such agency initiatives as CALS and other DoD programs. As major systems reach full implementation and the forecasted benefits are realized, it will become easier to justify expanded systems and new systems at other agencies.

Other vendors noted that budgetary constraints have slowed the growth of EC at agencies and delayed the integration of other applications. Furthermore, budget cuts have narrowed the choices available to some agencies for systems. Lastly, several vendors were of the opinion that agencies need to more fully justify the initial investment costs for EC systems, now that agency budgets are subject to closer scrutiny.

4. Legal Issues

EC transactions involve several legal issues still unresolved by both the government and the vendor community. However, EC systems continue to increase in their number of trading partners, despite lack of settlement in several areas of legal concerns. The major areas of legal issues include the following:

- Authenticity of signatures
- Authenticity of documents
- Liability limitations
- Legally effective delivery times
- Responsibilities for error detection
- Validity of contracts

Companies in various segments of the EC industry are already working on establishing valid EC business arrangements and agreements on legal issues. A group of sixty companies has formed the Legal Issues Task Group to examine the legal, auditing, security and other business-related concerns that surround EC. This ad hoc group operates under the auspices of ANSI. The main objectives of the Task Group are to promote understanding of EC legal issues within the industry and work toward establishing appropriate guidelines.

5. Security Issues

Federal suppliers have expressed continuing concern over security issues. In many respects, the government tends to be a more demanding buyer than its commercial counterparts. The government requests more information on costs, suppliers, staffing practices, polluting practices, and a

variety of other issues. Without adequate safeguards, suppliers fear that some agencies might abuse EC technology to gather excessive company information. This will have to be sorted out before EC can make significant headway.

The smoother, faster, and more accurate transfer of information, a key motivator for EC, also leads to increased security and proprietary information protection concerns. In most cases, defense contractors do not want to open their internal data bases to the Pentagon. The same holds true for firms electronically filing their tax returns or 10K reports to the SEC. An automated purchase order/invoice/payment system is one thing; electronic access by the government to company internal files is quite another.

INPUT expects industry to try to slow EC migration somewhat until the security issue is resolved. Since industry is participating heavily in the CALS program, security concerns must be addressed. Therefore, EC will ultimately require the revision of federal security policies, to prevent unauthorized access to and disclosure of sensitive information. Vendor proprietary data is especially vulnerable. As federal security policies evolve to handle the threat, EC activities will advance and become more widespread.

More information on this topic is provided in a companion INPUT report on the federal computer security market.

Some vendors also noted that signature authentication technology will be critical to widespread federal EC implementation. The signature issue involves data security, legal and auditing concerns that must be resolved. Proper security safeguards must be initiated before EC data can be considered secure. The draft standard currently being circulated for comment will resolve many of these issues.

Furthermore, the federal government still has to address the exchange of sensitive data. Much of the sensitive data on systems may remain on proprietary EC systems, rather than being integrated into systems that are interoperable.

6. Future Growth of the Federal EC Market

Although the majority of vendors currently have only a small share (under 1%) of their business directed to federal EC products and services, the industry respondents all expect this market segment to increase. Their views on the reasons for expected future growth in the federal EC market are noted in Exhibit V-18.

EXHIBIT V-18

Industry Views on Factors for Growth of the Federal EC Market

Reason for Growth	Rank*
Recent awards	1
Increased focus on EC by agencies	2
Successful agency initiatives	3
Migration to additional EC applications	4
Increased policy emphasis on paperless environment	5

*Rank based on frequency of mention.

Industry views the recent awards of several major systems quite favorably. Most companies expect these highly publicized awards to serve as an impetus for the federal government's use of EC elsewhere. An increased focus on EC among agencies is being seen by many industry respondents as the government strives toward planning and implementing procurement and purchasing systems.

Vendors also noted that successful agency initiatives, such as the EDGAR project at the SEC and Customs programs, promote EC's benefits among other agencies. EC still needs greater visibility among the federal agencies as well as an understanding of its true cost effectiveness before more agencies will undertake pilot systems.

In the future, the federal government will be integrating additional agency applications to EC. This expansion will present additional opportunities to EC vendors for software and system integration.

Lastly, policy directives by OMB and DoD are mandating that federal agencies utilize electronic systems. Efforts are already being made by DoD agencies to operate in a paperless environment. Civilian agencies will slowly follow as they become more aware of EC's full capabilities and can find appropriate funding for development of systems.

G**Conclusions and Recommendations**

Federal EC has matured considerably over the last two years, and will likely continue to expand. Budgetary, policy, and technological factors are converging to propel EC into a major place in the federal information systems marketplace. However, many agency, supplier, and vendor executives do not yet fully understand EC or appreciate its market potential or its benefits.

INPUT expects this situation to change as the forces driving EC become unavoidable. The government will need to overcome current EC impediments, such as security concerns and EC literacy, with better policies, safeguards, and user education.

EXHIBIT V-19**Vendor Recommendations**

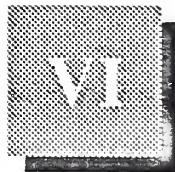
- Understand federal acquisitions
- Recognize the obstacles
- Be flexible
- Have the required technology
- Accommodate teaming requirements
- Keep pricing understandable

In general, INPUT urges vendors to:

- Understand the federal acquisition environment and process
- Understand and appreciate the obstacles that agency executives face in implementing EC
- Display the flexibility of tailored offerings to agency needs, rather than the other way around
- Provide the technology required by federal executives

- Accommodate federal teaming requirements in order to participate in federal SI jobs that include EC
- Establish pricing mechanisms that federal contracting officers can understand

As EC becomes more accepted in the commercial environment, federal EC will also grow, driven by the same dynamics impacting commercial firms as well as by some unique issues. Each sphere of influence will have expectations of the other, further fueling the overall EC market.



Key Opportunities

This section describes specific opportunities in the federal information technology market. Lists of programs are provided for future EC systems acquisitions. The opportunities list consists of major programs that are typical of the federal market and serves as a representative sample.

Unlike most other delivery modes, EC is contained in relatively few published federal opportunities. This results from three factors:

- Most EC programs are relatively small, and therefore do not appear in either INPUT's PAR data base or agency budget submissions.
- Many federal initiatives that would be prime candidates for EC do not include it as a part of agency requirements.
- Many EC elements are included as part of larger system projects.

INPUT's PAR data base contains dozens of programs that would function more efficiently if EC were included. For example, the Labor Department is currently acquiring a new computer system to support a key data base. The Employee Retirement Insurance Security Act (ERISA) of 1971 requires that the Labor Department maintain a data base on company pension plans. Companies complete and submit a form 5500 to Labor, containing the required information. Labor then enters the information into its ERISA data base.

This represents a classic opportunity for EC. Presumably, most companies, or at least larger companies, generate the required form from a computer. The system would likely work faster and would certainly be more accurate if the paper were eliminated and the data was transferred directly between computers. However, to INPUT's knowledge, no EC activity is planned in connection with ERISA.

A

Present and Future Programs

New information technology programs larger than \$1 million-\$2 million are listed in at least one of the following federal government documents:

- OMB/GSA Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11
- Agency long-range information resource plans developed to meet the reporting requirements of the Paperwork Reduction Act of 1980
- Agency annual operating budget requests submitted to both congressional oversight and appropriations committees based on the OMB A-11 information
- *Commerce Business Daily* for specific opportunities, for qualifications as a bidder, and to obtain a copy of an RFP or RFQ
- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies
- Classified program documentation available to qualified DoD contractors

EC opportunities may not be specifically identified as such in these documents. Information technology planning documents usually identify mission requirements to be met by specific programs rather than methods for meeting these requirements. Some mission requirements could be satisfied equally well by different types of acquisition. An agency decision to use a systems integration contractor may not be made until a program is well under way and an acquisition plan has been formulated. EC support would be provided as part of the integration effort. Over the last several years, however, agencies have shown an increasing tendency to use systems engineering and integration contractors for larger, more-complex systems.

All funding proposals are based on cost data of the year submitted with inflation factors dictated by the Administration as part of its fiscal policy, and are subject to revision, reduction, or spread to future years in response to congressional direction. Some additional reductions may be likely in FY 1992 and beyond due to the deficit reduction efforts and other budgetary constraints.

B

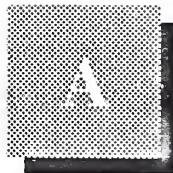
EC/CALS Opportunities by Agency

Agency	Program	PAR Reference	RFP Estimated Schedule	Estimated Funding FY92-FY97 (\$ Million)
JCMO	CALS/IUSS	V-03-125	10/91	-
	JCALS phased	V-02-035	Multi-	60
			(entire contract could be worth \$750M - \$1B) FY91 expenditure total \$15.8M	
	USAF/CALS V-1-108	V-1-53	Multiple	
	Navy/CALS/ EDMICS	V-03-080	154	
	DLA/CALS/ CTOL	V-04A-014	39	
Commerce/ NIST	CALS	VI-06-045	1/92	2
Interior/ MMS	TIMS	VII-09-027	On hold	60
Education/ OPE	General Electronic Support	VII-13-014 VII-13-017 VII-13-019	6	
OMB/OFPP	Government- wide Procurement Automation Program	VIII-14-019	-	
HHS/FSA	Child Support Enforcement National Communications Network	VII-080-039	4/91	11

Agency	Program	PAR Reference	RFP Estimated Schedule	Estimated Funding FY92-FY97 (\$ Million)
Army/AMC	Standard Depot System Modernization	V-2-28	6/90	25

NOTE A: Numerous previously awarded multiphased implementation projects are subject to technology infusion by adding new EC products not available during initial contract award.

NOTE B: Total JCALS budget representing about 25 separate projects was approximately \$230 million for FY 1991.



Interview Profiles

**A**

Federal Agency Respondent Profile

1. Contact Summary

Contacts with agencies were made by telephone and mail. The majority of the agency interviews were conducted at the department level with officials in the office of Information Resources Management who are responsible for computer systems policy and planning.

The distribution of job classifications among individual agency respondents for the analysis is as follows:

	Policy	Buyers	Users	Total
Respondents	13	8	4	25

2. List of Agencies Interviewed

Respondents interviewed represented the agencies listed below.

- Department of Agriculture
- Department of Commerce
 - Bureau of the Census (2)
 - National Institute of Standards and Technology
 - NOAA
- Department of Defense
- Office of the Secretary of Defense (2)
- Defense Contract Audit Agency
- Department of Energy
 - Los Alamos National Laboratory
- Environmental Protection Agency
- Federal Reserve Bank
- Government Services Administration
 - Federal Supply Service (2)

- Government Pricing Office
- Department of the Interior
- Office of Management and Budget (1)
 - Office of Federal Procurement Policy (1)
- Department of Labor (2)
- Securities and Exchange Commission
- Department of State
- Department of Treasury
 - Financial Management Services (1)
 - Internal Revenue Service (2)
- Department of Veterans Affairs

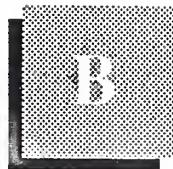
B

Vendor Respondent Profile

For this study INPUT contacted a representative sample of vendors who provide EDI products and services to the federal government.

INPUT interviewed vendors in the following categories: executive, marketing, and technical.

All contacts with vendor personnel were made by telephone.



Agency Planning Level Questionnaire

Confidential

INPUT Questionnaire—Federal Agencies

EDI Planning

Study Title: *Federal Electronic Data Interchange
Market (1989-1994)*

Catalog No. FISSP-63

Code: E-FDI

Interview Type:

Buyer Telephone
 User On-Site
 Policy Mail

Date: _____

Interviewer: _____

This questionnaire is directed to the study of the federal government's plans for the use of Electronic Data Interchange (EDI) in the computer to computer exchange of business documents. The study focuses on the planning process, EDI application areas and relevant issues for implementing EDI at federal agencies.

Respondent Name: _____

Title: _____ Phone: _____

Department: _____

Agency: _____

Address: _____

Office Code: _____

Function: _____

Referrals: _____

THANK YOU FOR YOUR PATIENCE IN COMPLETING THIS QUESTIONNAIRE.

PLEASE RETURN THIS QUESTIONNAIRE BY _____ IN THE ENCLOSED ENVELOPE.

YOU WILL RECEIVE AN EXECUTIVE SUMMARY OF THIS REPORT.

Confidential

Federal Electronic Data Interchange Market Questionnaire

EDI Planning

1. How would you describe your agency's level of involvement in EDI? (Check one)

- Just beginning to look at it.
- Actively planning an EDI project.
- Close to implementation
- Other (_____)

2. Who is responsible for the EDI planning activity? (Check one)

- The Information Services Department
- Functional Department
- Committee (_____)
- Other (_____)
- Don't Know

3. Can you estimate when you expect to be implementing and using EDI? (Check one)

- this year (1989) after 1991
- next year (1990) no plan/dk
- 1991

4. Are you using any outside help with planning for EDI? (Check one)

- Yes
- No

If YES, did this help come from: (Check all that apply)

- A network or a remote computing service?
- A software company?
- A professional services firm?
- An independent consultant?
- An industry association?
- Other (please specify) _____

5a. How much is budgeted for yearly expenditures for EDI at your organization/agency? (Check one)

- \$250,000 and under
- \$251,000 - \$499,999
- \$500,000 - \$999,999
- \$1,000,000 - \$4,999,999
- Over \$5,000,000

5b. Amount is allocated for: (Check one)

- Total agency/department
- Specific organization within agency/department (_____)

EDI Issues and Concerns

6. Below is a list of issues and problems which we believe federal agencies may be concerned about. Please rate on a 1-5 scale, with "5" being "a serious concern" and 1 being "not a serious concern".

In your opinion, how much of a concern is/are:

	Rating				
	1	2	3	4	5
The COST of using EDI	1	2	3	4	5
Network/Data SECURITY	1	2	3	4	5
Software MAINTENANCE	1	2	3	4	5
LEGAL Issues	1	2	3	4	5
The requirements of the AUDITING Staff	1	2	3	4	5
Changing BUSINESS PRACTICES, for example managing the change from paper forms to electronic forms	1	2	3	4	5
RELIANCE on ONE VENDOR or Service	1	2	3	4	5
VENDOR VIABILITY	1	2	3	4	5
The state of EDI STANDARDS	1	2	3	4	5
The COMPATIBILITY of EDI data and your applications	1	2	3	4	5
OTHER CONCERNS? _____	1	2	3	4	5

7. What are the major reasons for your agency deciding to use Electronic Data Interchange systems? (Check all that apply)

- Replace paper documents for selected applications.
- Supplement paper document exchange.
- Add electronic functions to existing on-line data systems.
- Improve productivity of information exchange.
- Support agency's mission (Specify mission _____)
- Mandated EDI program for agency

8. What are your agency's expectations for your EDI system? (Insert numbers)

_____ Number of EDI transactions per year (including all document types)

_____ Number of trading partners on system initially

_____ Number of trading partners on system by FY1994

_____ Percent growth in the number of EDI transactions per year after implementation.

Applications

9. What types of applications are you planning to run on your organization's EDI system? (Check all that apply in each column)

	Initially	Future
Payments	<input type="checkbox"/>	<input type="checkbox"/>
Procurement Functions	<input type="checkbox"/>	<input type="checkbox"/>
Purchase Orders	<input type="checkbox"/>	<input type="checkbox"/>
Personnel/Human Resources	<input type="checkbox"/>	<input type="checkbox"/>
Ordering/Solicitations	<input type="checkbox"/>	<input type="checkbox"/>
Financial	<input type="checkbox"/>	<input type="checkbox"/>
Bills of Lading	<input type="checkbox"/>	<input type="checkbox"/>
Data Transfers	<input type="checkbox"/>	<input type="checkbox"/>
Invoices	<input type="checkbox"/>	<input type="checkbox"/>
Requirements Data Base	<input type="checkbox"/>	<input type="checkbox"/>

Inventory	<input type="checkbox"/>	<input type="checkbox"/>
Distribution	<input type="checkbox"/>	<input type="checkbox"/>
Cost Quotes	<input type="checkbox"/>	<input type="checkbox"/>
Electronic Funds Transfer	<input type="checkbox"/>	<input type="checkbox"/>
Transportation Functions	<input type="checkbox"/>	<input type="checkbox"/>
Collections	<input type="checkbox"/>	<input type="checkbox"/>
Administrative Messages	<input type="checkbox"/>	<input type="checkbox"/>
Other (_____)	<input type="checkbox"/>	<input type="checkbox"/>

10a. Are any applications from the DoD CALS initiatives to become part of your EDI system?

Yes No Future Plans

10b. Which applications? (*Including logistics, etc.*)

Communications & Hardware Environment

11a. What size computer are you planning to be using for EDI translation and communications? (*Check all that apply*)

micro
 mini
 mainframe
 other

11b. Are any of the computers you plan to use for EDI connected to other computers within your agency? (*If YES; Could you explain the connectivity please?*) No Yes

12a. How are you planning to implement EDI? (*Check one*)

Directly with trading partners
 Using a third party data network
 Combination of direct and third party

12b. (If using THIRD PARTY NETWORK or COMBINATION) Which third party network are you considering using for EDI? (*Check all that apply*)

AT&T
 Control Data
 GEISCO
 IBM Information Network
 Kleinschmidt
 McDonnell Douglas' Tymnet
 Sterling Software's Ordernet
 TranSettlements
 TransNet
 Other (_____)

13. Has your agency initiated any pilot EDI program(s)? *(Check one)*

Yes No

If YES:

Name of Program: _____

Status: _____

Brief description: _____

Software Environment

14a. How do you plan to acquire the EDI software? *(Check one)*

- Write it yourself.
- Purchase it.
- Buy a package and customize it.
- Obtain it from another agency.

14b. Why will you take this approach?

14c. Do you have any particular vendors in mind?

15. Could you rate the importance of EDI software features? On a scale of 1-5, with 5 being very important, how important is it for EDI software to:

	Rating				
BE EASILY INTEGRATED with other					
business applications such as					
accounting, inventory, etc.	1	2	3	4	5
Support GRAPHICS	1	2	3	4	5
Be EASILY USED by non-computer users	1	2	3	4	5
Have ENCRYPTION capabilities	1	2	3	4	5
Be EASILY UPGRADED to new standards	1	2	3	4	5
ACKNOWLEDGE successful transmission	1	2	3	4	5
Report EXCEPTIONS clearly	1	2	3	4	5
Have a MAINTENANCE AGREEMENT for updates/fixes	1	2	3	4	5

16. With regard to integrating EDI software with other applications such as accounting, or purchasing, which is most preferable? *(Check one)*

- To integrate the EDI software with your other applications yourself.
- To have the software company do the integration
- To use a systems integrator
- Other (_____)

Acquisition Plans

17. What method of procurement does your agency plan to use for its purchase of EDI products and services? (*Please check all that apply*)

GSA schedules
 RFPs for specific EDI purchase
 Purchase EDI system as part of other procurement
 Other (_____)

18. What type of contract does your agency plan to use for EDI procurements?

Cost-Plus
 Fixed-Price
 Mix
 Other (*specify*) _____
 Not yet planned

19. Which of the following EDI products and services will most likely be acquired by your agency through FY1994? (*Check all that apply*)

Third-party network services
 Translation software packages
 Additional operating software
 Applications software
 On-line order entry system
 Data encryption equipment
 Software driven password security products
 Secure networking products
 Contractor assistance for planning and implementation
 Other contractor support
 Other computer devices for EDI
 Other (_____)
 Not yet planned

Market Perceptions

20. In your opinion, who are some of the leading vendors in the federal EDI market? (*Specify vendor names*)
_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

21. Any suggestions for specific features needed or improvements to EDI products and services offered by vendors?

22. What impact, if any, do you expect on your suppliers following the implementation of EDI?

23. Has your agency published any internal guidelines on EDI computer systems for potential industry vendors?
 Yes No
If YES, are these plans publicly available?
 Yes No

24. What role have commercial EDI developments played in your agencies' EDI plans? (*Check all that apply*)

Closely monitored and used commercially developed products and services.
 Some adaptation of commercial EDI systems.
 No adaptation
 View government as having uniquely different EDI requirements.
 Still waiting and watching commercial sector.
 None of the above.
 Other _____

Impacts/Trends

25. How are technological changes affecting your agency's EDI system requirements through FY1994?

Technology	Impact
_____	_____
_____	_____
_____	_____
_____	_____

26. Could you please identify those industry or market factors (non-technical) that would have the greatest impact on your agency's EDI system plans? (*Including industry mergers, business trends, etc.*)

27. What impact, if any, have federal government constraints had on your agency's EDI systems planning requirements?

28. How will each of the following government policies impact on your agency's EDI acquisitions & implementations through FY1994?

DoD or NIST standards: _____

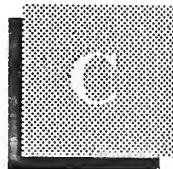
Specific CALS standards: _____

The Taft Directive: _____

FTS 2000: _____

Computer Security Legislation/Directives: _____

Any other policy initiatives by GSA or legislative organizations? (*specify*) _____



Agency User Level Questionnaire

Confidential

INPUT Questionnaire—Federal Agencies

EDI Usage

Study Title: *Federal Electronic Data Interchange Market (1989-1994)*

Catalog No. FISSP-64

Code: E-FDI

Interview Type:

Buyer Telephone
 User On-Site
 Policy Mail

Date: _____

Interviewer: _____

This questionnaire is directed to the study of the federal government's plans for the use of Electronic Data Interchange (EDI) in the computer to computer exchange of business documents. The study focuses on the implementation process, EDI application areas and relevant issues for utilizing EDI at federal agencies.

Respondent Name: _____

Title: _____ Phone: _____

Department: _____

Agency: _____

Address: _____

Office Code: _____

Function: _____

Referrals: _____

THANK YOU FOR YOUR PATIENCE IN COMPLETING THIS QUESTIONNAIRE.

PLEASE RETURN THIS QUESTIONNAIRE BY _____ IN THE ENCLOSED ENVELOPE.

YOU WILL RECEIVE AN EXECUTIVE SUMMARY OF THIS REPORT.

Confidential

Federal Electronic Data Interchange Market Questionnaire

Status of EDI Programs

1. How would you describe your agency's current level of involvement in EDI? (Check one)

- Utilizing agency EDI system.
- Actively implementing an EDI project.
- Close to implementation.
- Other (_____)

2. Who is responsible for the EDI utilization activity? (Check one)

- The Information Services Department
- Functional Department
- Committee (_____)
- Other (_____)
- Don't Know

3. Estimated date of implementation for EDI system:

_____ (year)

- Unknown

4a. Did you use contract support for EDI implementation? (Check one)

- Yes
- No

4b. If yes, what type(s) of contract support did you use? (Check all that apply)

- An independent consultant
- A professional services firm
- An industry association
- A communications company, such as a value-added network
- A Remote Computing Service
- A financial services organization
- Some other types of contractor (please specify)

5. Could you please tell me what Value Added Networks (VANs) or remote computing service (RCS) your agency currently uses?

6a. How much is budgeted for yearly expenditures for EDI at your organization/agency? (Check one)

- \$250,000 and under
- \$251,000 - \$499,999
- \$500,000 - \$999,999
- \$1,000,000 - \$4,999,999
- Over \$5,000,000

6b. Amount is allocated for:

- Total agency/department
- Specific organization within agency/department? (_____)

Hardware & Software Environment

7. What hardware do you use for EDI? (*Check all that apply*)

- micro
- mini
- mainframe
- Other _____

8. Are any of the computers you use for EDI connected to other computers within your agency? (*If YES: Could you explain the connectively please?*) Yes No

9. Are you using a VAN or Third Party Network for EDI?

- Yes
- No

Which third party network are you using for EDI? (*Check all that apply*)

- AT&T
- Control Data
- GEISCO
- IBM Information Network
- Kleinschmidt
- McDonnell Douglas' Tymnet
- Sterling Software's Ordernet
- TranSettlements
- TransNet
- Other (_____)

10. How did you acquire the EDI software? (*Check one*)

- Write it yourself.
- Purchase it.
- Buy a package and customize it.
- Obtain from another agency.
- Other (_____)

Why did you take this approach? _____

11. With regard to integrating EDI software with other applications such as accounting, or purchase, which is more preferable?

- To integrate the EDI software with your other applications yourself.
- To hire a consultant or professional services firm to integrate the EDI software with your other applications.
- To buy new software for accounting, inventory, etc. with built-in EDI functionality.
- To have the software company do the integration.
- To use a systems integrator.
- Other (_____)

THANK YOU FOR YOUR PATIENCE IN COMPLETING THIS QUESTIONNAIRE.

PLEASE RETURN THIS QUESTIONNAIRE BY _____ IN THE ENCLOSED ENVELOPE.

YOU WILL RECEIVE AN EXECUTIVE SUMMARY OF THIS REPORT.

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Federal Electronic Data Interchange Market Questionnaire

Status of EDI Programs

1. How would you describe your agency's current level of involvement in EDI? (Check one)

- Utilizing agency EDI system.
- Actively implementing an EDI project.
- Close to implementation.
- Other (_____)

2. Who is responsible for the EDI utilization activity? (Check one)

- The Information Services Department
- Functional Department
- Committee (_____)
- Other (_____)
- Don't Know

3. Estimated date of implementation for EDI system:

_____ (year)

- Unknown

4a. Did you use contract support for EDI implementation? (Check one)

- Yes
- No

4b. If yes, what type(s) of contract support did you use? (Check all that apply)

- An independent consultant
- A professional services firm
- An industry association
- A communications company, such as a value-added network
- A Remote Computing Service
- A financial services organization
- Some other types of contractor (please specify)

5. Could you please tell me what Value Added Networks (VANs) or remote computing service (RCS) your agency currently uses?

6a. How much is budgeted for yearly expenditures for EDI at your organization/agency? (Check one)

- \$250,000 and under
- \$251,000 - \$499,999
- \$500,000 - \$999,999
- \$1,000,000 - \$4,999,999
- Over \$5,000,000

6b. Amount is allocated for:

- Total agency/department
- Specific organization within agency/department? (_____)

Hardware & Software Environment

7. What hardware do you use for EDI? (*Check all that apply*)

- micro
- mini
- mainframe
- Other _____

8. Are any of the computers you use for EDI connected to other computers within your agency? (*If YES: Could you explain the connectively please?*) Yes No

9. Are you using a VAN or Third Party Network for EDI?

- Yes
- No

Which third party network are you using for EDI? (*Check all that apply*)

- AT&T
- Control Data
- GEISCO
- IBM Information Network
- Klcinschmidt
- McDonnell Douglas' Tymnet
- Sterling Software's Ordernet
- TranSettlements
- TransNet
- Other (_____)

10. How did you acquire the EDI software? (*Check one*)

- Write it yourself.
- Purchase it.
- Buy a package and customize it.
- Obtain from another agency.
- Other (_____)

Why did you take this approach? _____

11. With regard to integrating EDI software with other applications such as accounting, or purchase, which is more preferable?

- To integrate the EDI software with your other applications yourself.
- To hire a consultant or professional services firm to integrate the EDI software with your other applications.
- To buy new software for accounting, inventory, etc. with built-in EDI functionality.
- To have the software company do the integration.
- To use a systems integrator.
- Other (_____)

12. Could you rate the importance of EDI software features? On a scale of 1-5, with 5 being very important, how important is it for EDI software to:

	Rating				
BE EASILY INTEGRATED with other business applications such as accounting, inventory, etc.					
Support GRAPHICS	1	2	3	4	5
Be EASILY USED by non-computer users	1	2	3	4	5
Have ENCRYPTION capabilities	1	2	3	4	5
Be EASILY UPGRADED to new standards	1	2	3	4	5
ACKNOWLEDGE successful transmission	1	2	3	4	5
Report EXCEPTIONS clearly	1	2	3	4	5
Have a MAINTENANCE AGREEMENT for updates/fixes	1	2	3	4	5

Applications/Transactions

13. What types of applications are you currently running on your organization's EDI system? Which will be done in the future? (*Check all that apply in each column*)

	Current	Future
Payments	<input type="checkbox"/>	<input type="checkbox"/>
Procurement Functions	<input type="checkbox"/>	<input type="checkbox"/>
Purchase Orders	<input type="checkbox"/>	<input type="checkbox"/>
Personnel/Human Resources	<input type="checkbox"/>	<input type="checkbox"/>
Ordering/Solicitations	<input type="checkbox"/>	<input type="checkbox"/>
Financial	<input type="checkbox"/>	<input type="checkbox"/>
Bills of Lading	<input type="checkbox"/>	<input type="checkbox"/>
Data Transfers	<input type="checkbox"/>	<input type="checkbox"/>
Invoices	<input type="checkbox"/>	<input type="checkbox"/>
Requirements Data Base	<input type="checkbox"/>	<input type="checkbox"/>
Inventory	<input type="checkbox"/>	<input type="checkbox"/>
Distribution	<input type="checkbox"/>	<input type="checkbox"/>
Cost Quotes	<input type="checkbox"/>	<input type="checkbox"/>
Electronic Funds Transfer	<input type="checkbox"/>	<input type="checkbox"/>
Transportation Functions	<input type="checkbox"/>	<input type="checkbox"/>
Collections	<input type="checkbox"/>	<input type="checkbox"/>
Administrative Messages	<input type="checkbox"/>	<input type="checkbox"/>
Other (_____)	<input type="checkbox"/>	<input type="checkbox"/>

14. What transactions are you now doing, and which do you plan to do via EDI, and in what time frame? (*Check appropriate column*)

		Time Frame		
	Now	1990	3 years	d/k
(a) Purchase Orders to Suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Bills of Lading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Payments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. What are your agency's expectations for your EDI systems? (*Insert numbers*)
 _____ Number of EDI transactions per year (including all document types)
 _____ Number of trading partners on system initially
 _____ Number of trading partners on system by FY1994
 _____ Percent growth in the number of EDI transactions per year after implementation.

CALS Applications/Standards

16a. Which standards, in your opinion, are being observed in implementing CALS-related initiatives?

16b. Which applications are being implemented using a CALS approach?

16c. Which of these applications have proceeded beyond the pilot stage to full scale implementation?

None yet

17. Is your agency initiating agency programs which will include both CALS and EDI activities? (*Check one*)

Yes No

If YES, names of program: _____

Acquisition Plans

18. Which of the following EDI products and services will most likely be acquired by your agency through FY1994? (*check all that apply*)

Third-party network services
 Translation software packages
 Additional operating software
 Applications software
 On-line order entry system
 Data encryption equipment
 Software driven password security products
 Secure networking products
 Contractor assistance for planning and implementation
 Other contractor devices for EDI
 Other (_____)
 Not yet planned

19. What method of procurement does your agency use for its purchase of EDI products and services? (*Please check all that apply*)

GSA schedules
 RFPs for specific EDI purchase
 Purchase EDI system as part of other procurement
 Other (_____)

20. What type of contract does your agency prefer for EDI products and services? (Check appropriate column)

	Cost-Plus	Fixed Price	Mix	Other (specify)
EDI Hardware	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
EDI Software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
EDI Support Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other EDI Products/Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

21. What do you believe that the federal agencies consider the controlling criteria in the selection of an EDI vendor? (Please indicate Rank 1, 2, 3, etc.)

_____ Proposed technical solution
 _____ Contract type
 _____ Risk containment procedures
 _____ Security safeguards
 _____ Initial cost
 _____ Life cycle cost
 _____ Other (specify) _____
 _____ Don't know

Market Perceptions

22. In your opinion, who are some of the leading vendors in the federal EDI market? (Specify vendor names)

_____, _____, _____,
 _____, _____, _____, _____

23. How would you rate the following EDI vendor (contractor) characteristics with respect to performance for your agency? (1=Definitely Not Important, 2=Somewhat Important, 3=Important, 4=Very Important, 5=Crucial)

Characteristic Rating

1. Application experience	1	2	3	4	5
2. Integration experience	1	2	3	4	5
3. Staff experience	1	2	3	4	5
4. Hardware offered	1	2	3	4	5
5. Software offered	1	2	3	4	5
6. Support	1	2	3	4	5
7. Federal contract experience	1	2	3	4	5
8. Agency experience	1	2	3	4	5
9. Price	1	2	3	4	5
10. Location	1	2	3	4	5
11. Other _____	1	2	3	4	5

24a. What differences do you see between civilian and defense markets for governmental EDI products and services?

24b. Why do these differences exist? (i.e. Technical Regulatory, Funding, Nature of Clients, etc.)

25. How have developments in the commercial EDI market impacted on the federal market?

26. Has your agency published any internal guidelines on EDI computer systems for potential industry vendors?

Yes No (*Check one*)

If YES, are these plans publicly available?

Yes No (*Check one*)

Vendor Participation

27. What type of vendor or organization appears most appropriate for providing EDI products and services for your agency? (*Check one or more*)

- Hardware vendors
- Professional service firms
- Software vendors
- Systems integration
- Aerospace division
- Not-for-profit firms
- Other _____

28a. In your opinion, what level of satisfaction, on a scale of 1 to 5, has your agency experienced with vendor EDI support in the past regarding? (*1 = Lowest, 5 = Highest*)

	Rating				
	1	2	3	4	5
Quality of work	1	2	3	4	5
Quantity of work	1	2	3	4	5
Responsiveness	1	2	3	4	5
Project management	1	2	3	4	5
Development visibility	1	2	3	4	5
Delivery schedule(s)	1	2	3	4	5
Cost	1	2	3	4	5

28b. How might the EDI support have been improved (i.e. impact of teaming with operational support vendors)?

EDI Issues and Concerns

29. Below is a list of issues and problems which we believe federal agencies may be concerned about. Please rate on a 1-5 scale, with "5" being "a serious concern" and 1 being "not a serious concern".

In your opinion, how much of a concern is/are:

	Rating				
	1	2	3	4	5
The COST of using EDI	1	2	3	4	5
Network/Data SECURITY	1	2	3	4	5
Software MAINTENANCE	1	2	3	4	5
LEGAL Issues	1	2	3	4	5
The requirements of the AUDITING Staff	1	2	3	4	5
Changing BUSINESS PRACTICES, for example managing the change from paper forms to electronic forms	1	2	3	4	5
RELIANCE on ONE VENDOR or Service	1	2	3	4	5
VENDOR VIABILITY	1	2	3	4	5
The state of EDI STANDARDS	1	2	3	4	5
The COMPATIBILITY of EDI data and your applications	1	2	3	4	5
OTHER CONCERNS? _____	1	2	3	4	5

30. What would be critical success factors in "an ideal EDI system" for each of these system components?
Software: _____

Hardware: _____

Communications: _____

System Response Time: _____

System Integrity: _____

Impacts/Trends

31. What impact, if any, have federal government budgetary constraints had on the development and implementation of EDI systems?

32. How are technological changes affecting your agency's EDI system requirements through FY1994?

Technology	Impact
_____	_____
_____	_____
_____	_____
_____	_____

33. Could you please identify those industry or market factors (non-technical) that would have the greatest impact on your agency's EDI system plans? (*Including industry mergers, business trends, etc.*)

34. How will each of the following government policies impact on your agency's EDI acquisitions & implementations through FY1994?
DoD or NIST standards: _____

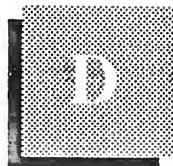
Specific CALS standards: _____

The Taft Directive: _____

FTS 2000: _____

Computer Security Legislation/Directives: _____

Any other policy initiatives by GSA or legislative organizations? (*specify*) _____



Industry Vendor Questionnaire

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INPUT Questionnaire—Industry Vendors

Study Title: *Federal Electronic Data Interchange
Market (1989-1994)*

Catalog No. FISSP-65

Code: E-FDI

Interview Type:

Marketing Telephone
 Technical On-Site
 Executive Mail

Date: _____

Interviewer: _____

Respondent Name: _____

Title: _____ Phone: _____

Company: _____

Address: _____

Office Code: _____

Note: Would your company be available to provide a case study example of a recent installation of an agency EDI system?

Yes No

Is so, Agency Program Title: _____

Company Point of Contact (Name): _____

(Phone): _____

THANK YOU FOR YOUR PATIENCE IN COMPLETING THIS QUESTIONNAIRE.

PLEASE RETURN THIS QUESTIONNAIRE BY _____ IN THE ENCLOSED ENVELOPE.

YOU WILL RECEIVE AN EXECUTIVE SUMMARY OF THIS REPORT.

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Industry Questionnaire - Federal Electronic Data Interchange Market

This questionnaire is directed to the study of the federal government's use of Electronic Data Interchange (EDI) in the computer to computer exchange of business documents. The study focuses on the implementation process, EDI application areas and relevant issues for utilizing EDI at federal agencies.

1. What type of EDI products and services do you provide or plan to provide to the federal government? (*Check all current and future services that apply*)

	Current	Future
Hardware		
- Computers	<input type="checkbox"/>	<input type="checkbox"/>
- Storage Devices	<input type="checkbox"/>	<input type="checkbox"/>
- Telecommunications	<input type="checkbox"/>	<input type="checkbox"/>
- Other (<i>Specify</i>) _____	<input type="checkbox"/>	<input type="checkbox"/>
Software		
- Standard EDI products	<input type="checkbox"/>	<input type="checkbox"/>
- Custom Support	<input type="checkbox"/>	<input type="checkbox"/>
- Other (<i>Specify</i>) _____	<input type="checkbox"/>	<input type="checkbox"/>
Communications		
- Remote Computing Services	<input type="checkbox"/>	<input type="checkbox"/>
- Value-Added Networks	<input type="checkbox"/>	<input type="checkbox"/>
- Other (<i>Specify</i>) _____	<input type="checkbox"/>	<input type="checkbox"/>
Systems Integration	<input type="checkbox"/>	<input type="checkbox"/>
Consulting Services	<input type="checkbox"/>	<input type="checkbox"/>
Other (<i>Specify</i>) _____	<input type="checkbox"/>	<input type="checkbox"/>

2a. What has been your company's agency experience for EDI support services?

Agency	Time Frame	Description
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

2b. Are you currently providing these EDI support services? (*Check one*)

Yes No

Market Perceptions

3. In your opinion, which federal agencies present the best marketing opportunities for the EDI equipment and services your company provides?

DoD including: _____

Why? _____

Civil agencies including: _____

Why? _____

How do the civilian and defense markets differ?

4a. What differences do you see between commercial markets and the federal market for your EDI products and services?

4b. Why do these differences exist? (i.e. Technical, Regulatory, Funding, Nature of Clients, etc.)

4c. How have developments in the commercial EDI market impacted on the federal market?

5. In your opinion, who are some of the leading vendors in the federal EDI market? (*Specify vendor names*)

6. Any suggestions for specific features needed or improvements to EDI products or services offered by vendors?

7. In your opinion, what specific problems or advantages do vendors face in the federal EDI market?
Problems: _____

Advantages: _____

Applications

8. What types of applications are federal agencies running on your company's EDI system equipment? (*Check all that apply in each column*)

	Initially	Future
Payments	<input type="checkbox"/>	<input type="checkbox"/>
Procurement Functions	<input type="checkbox"/>	<input type="checkbox"/>
Purchase Orders	<input type="checkbox"/>	<input type="checkbox"/>
Personnel/Human Resources	<input type="checkbox"/>	<input type="checkbox"/>
Ordering/Solicitations	<input type="checkbox"/>	<input type="checkbox"/>
Financial	<input type="checkbox"/>	<input type="checkbox"/>
Bills of Lading	<input type="checkbox"/>	<input type="checkbox"/>
Data Transfers	<input type="checkbox"/>	<input type="checkbox"/>
Invoices	<input type="checkbox"/>	<input type="checkbox"/>
Requirements Data Base	<input type="checkbox"/>	<input type="checkbox"/>
Inventory	<input type="checkbox"/>	<input type="checkbox"/>
Distribution	<input type="checkbox"/>	<input type="checkbox"/>
Cost Quotes	<input type="checkbox"/>	<input type="checkbox"/>

Electronic Funds Transfer	<input type="checkbox"/>	<input type="checkbox"/>
Transportation Functions	<input type="checkbox"/>	<input type="checkbox"/>
Collections	<input type="checkbox"/>	<input type="checkbox"/>
Administrative Messages	<input type="checkbox"/>	<input type="checkbox"/>
Other (_____)	<input type="checkbox"/>	<input type="checkbox"/>

9a. What applications are being implemented by federal agencies using a CALS (DoD initiative) type approach?

None:

9b. What standards are being observed in implementing CALS related initiatives?

None:

Software Environment

10. Could we rate the importance of EDI software features? On a scale of 1-5, with 5 being very important, how important is it for EDI software to:

	1	2	3	4	5
Feature					
BE EASILY INTEGRATED with other business applications	1	2	3	4	5
Support GRAPHICS	1	2	3	4	5
Be EASILY USED by non-computer users	1	2	3	4	5
Have ENCRYPTION capabilities	1	2	3	4	5
Be EASILY UPGRADED to new standards	1	2	3	4	5
ACKNOWLEDGE successful transmission	1	2	3	4	5
Report EXCEPTIONS clearly	1	2	3	4	5
Have a MAINTENANCE AGREEMENT for updates/fixes	1	2	3	4	5

11. With regard to integrating EDI software with other applications such as accounting, or purchasing, which is most preferable for government agencies:

- To integrate the EDI software with other applications themselves.
- To have the software company do the integration
- To use a systems integrator
- Other (_____)

EDI Issues and Concerns

12. Below is a list of issues and problems which we believe federal agencies may be concerned about, please rate, again on a 1-5 scale, with "5" being "a serious concern" and 1 being "not a serious concern".

How much of a concern is: Rating

The COST of using EDI	1	2	3	4	5
Network/Data SECURITY	1	2	3	4	5
Software MAINTENANCE	1	2	3	4	5
LEGAL issues	1	2	3	4	5
The requirements of the AUDITING Staff	1	2	3	4	5
Changing BUSINESS PRACTICES, for example managing the change from paper forms to electronic forms	1	2	3	4	5

RELIANCE on ONE VENDOR or Service	1	2	3	4	5
VENDOR VIABILITY	1	2	3	4	5
The state of EDI STANDARDS	1	2	3	4	5
The COMPATIBILITY of EDI data and your applications	1	2	3	4	5
OTHER CONCERNS? _____	1	2	3	4	5

13. What impact, if any, have federal government budgetary constraints had on the development and implementation of EDI systems?

14. What do you believe that agencies consider the controlling criteria in their selection of an EDI vendor? (Please indicate Rank 1,2,3, etc.)

_____ Proposed Technical Solution
 _____ Contract Type
 _____ Risk Containment Procedures
 _____ Security Safeguards
 _____ Initial Cost
 _____ Life Cycle Cost
 _____ Other (specify) _____
 _____ Don't Know

Vendor Participation

15. What methods of government procurements does your company use for federal marketing of EDI products and services? (Check all that apply)

GSA Schedules
 RFPs for specific EDI purchase
 Requirement contracts
 Install EDI products as part of other procurements
 Other methods (_____)

16. What type of contract does your company prefer for EDI products and services? (Check appropriate column)

	Cost-Plus	Fixed Price	Mix	Other (specify)
EDI Hardware	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
EDI Software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
EDI Support Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other EDI Products/Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

17. How do you think agencies rate the following EDI vendor (contractor) characteristics with respect to performance in the federal government? (1=Definitely Not Important, 2=Somewhat Important, 3=Important, 4=Very Important, 5=Crucial)

Characteristic	Rating				
	1	2	3	4	5
Application Experience	1	2	3	4	5
Integration Experience	1	2	3	4	5
Staff Experience	1	2	3	4	5
Hardware Offered	1	2	3	4	5
Software Offered	1	2	3	4	5
Support	1	2	3	4	5
Federal Contract Experience	1	2	3	4	5
Agency Experience	1	2	3	4	5
Price	1	2	3	4	5
Location	1	2	3	4	5
Other (_____)	1	2	3	4	5

18. In your opinion, what level of satisfaction, on 1 to 5 scale, have federal agencies experienced with overall EDI industry support features in the past? (1 = Lowest, 5 = Highest)

Feature	Rating				
	1	2	3	4	5
Quality of Work	1	2	3	4	5
Quantity of Work	1	2	3	4	5
Responsiveness	1	2	3	4	5
Project Management	1	2	3	4	5
Development Visibility	1	2	3	4	5
Delivery Schedule(s)	1	2	3	4	5
Cost	1	2	3	4	5

19. Which type(s) of vendor do you usually team with in your federal EDI contracts? (Check all that apply)

Vendor Type

Hardware Vendor
 Systems Integrator
 Professional Services Firm
 Software Manufacturer
 Aerospace Divisions
 Not-for-Profit Firms
 Foreign Manufacturers
 Other (_____)
 No Teaming

Impacts/Trends

20. How will technological changes affect the federal government's EDI systems requirements through FY1994?

Technology	Impact
_____	_____
_____	_____
_____	_____
_____	_____

21. Please identify those industry or market factors (non-technical) that would have the greatest impact on federal EDI systems plans? (*Including industry mergers, business trends, etc.*)

22. How will each of the following government policies impact on the government's EDI acquisitions & implementations through FY1994?

a. DoD or NIST standards: _____

b. Specific CALS standards: _____

c. The Taft Directive: _____

d. FTS 2000: _____

e. Computer Security Legislation/Directives: _____

f. Any other policy initiatives by GSA or legislative organizations? (*specify*) _____

Industry Revenues

23. What percent of your company's 1988 revenues is derived from the federal EDI market? _____ % (*Estimated Percent*)

24. Does your company think its revenues will increase, decrease, or remain constant in this segment of the federal market through FY1994 and why? (*Check one and explain*)

Increasing because: _____

Decreasing because: _____

Remaining the same because: _____

25. What range best describes your company's 1988 federal EDI market revenues? (*Check one*)

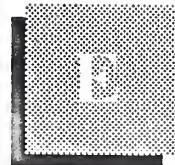
Less than \$250,000

\$251,000 to \$499,999

\$500,000 to \$999,999

\$1,000,000 to \$4,999,999

Over \$5,000,000



Glossary of Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

A

Federal Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACO	Administrative Contracting Offices (DCAS).
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTomatic DIgital Network of the Defense Communications System.
AUTOSEVOCOM	AUTOMATIC SECURE VOICE COMMUNICATIONS NETWORK
AUTOVON	AUTOMATIC VOICE NETWORK OF THE DEFENSE COMMUNICATIONS SYSTEM.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BMIL	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C ²	Command and Control.
C ³	Command, Control, and Communications.
C ⁴	Command, Control, Communications, and Computers.
C ³ I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CALS	Computer-Aided Automated Logistic System
CAPS	Command Automation Procurement Systems.

CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CCTC	Command and Control Technical Center (JCS).
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act
CIG	Computerized Interactive Graphics.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONTinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DCA	Defense Communications Agency.

DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office.
DECEO	DEfense Communications Engineering Office.
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DHHS	Department of Health and Human Services.
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DSCS	Defense Satellite Communication System.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.

EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRM	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price - Labor/Hour Contract.
FP-LOE	Fixed-Price - Level-Of-Effort Contract.
FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Proposed replacement for the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.

GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDEP	Interservice Data Exchange Program.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
IXS	Information Exchange System.
JFMIP	Joint Financial Management Improvement Program.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).

LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	“Earmarking” of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).

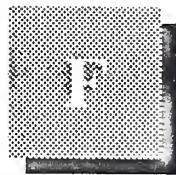
OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnection Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.

R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.

TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B**General and Industry Acronyms**

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	BELL Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultatif International de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	COmmon Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processor Unit.
DMBS	Data Base Management System.
DRAM	Dynamic Random Access Memory.
EIA	Electronic Industries Association.
EPROM	Erasible Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value Added Retailer.
VLSI	Very Large Scale Integration.
WORM	Write-Once-Read-Many-Times.



Definitions

The definitions in this appendix include hardware, software, services, and telecommunications categories to accommodate the range of information systems and services programs described in this report.

Alternate service mode terminology employed by the federal government in its procurement process is defined along with INPUT's regular terms of reference, as shown in Exhibit B-1.

The federal government's unique, non-technical terminology, associated with applications, documentation, budgets, authorization, and the procurement/acquisition process, is included in Appendix C, Glossary of Federal Acronyms.

A

Overall Definitions and Analytical Framework

Information Services - Computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- Bundled combinations of products and services where the vendor assumes responsibility for the development of a custom solution to an information system problem (called *Systems Integration*)

- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, videotex, etc. (called *Network Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the *Information Services Industry* consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels, and competitive issues.

All *Information Services Market* forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers.

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- Processing Services
- Network Services
- Professional Services
- Applications Software Products
- Systems Software Products

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services.

- Turnkey Systems
- Systems Operations
- Systems Integration

Section B describes the delivery modes and their structure in more detail.

Outsourcing is defined as the contracting of information systems (IS) functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that IS management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

IS has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that IS management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources.

B

Industry Structure and Delivery Modes

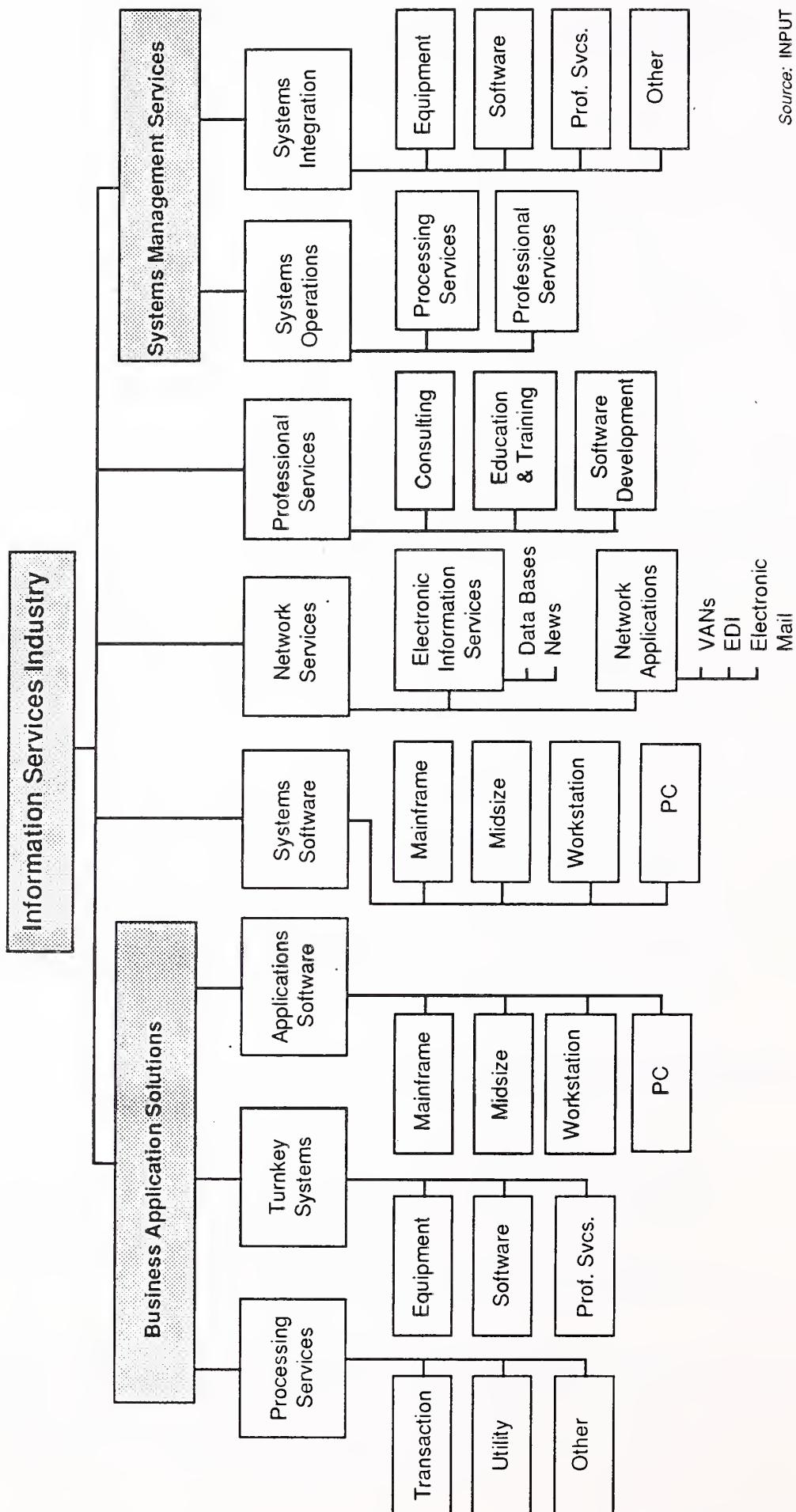
1. Services Categories

Exhibit B-1 presents the structure of the information services industry. Several of the delivery modes can be grouped into higher-level *Service Categories*, based on the kind of problem the user needs to solve. These categories are:

- *Business Application Solutions (BAS)* - prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., mortgage loan processing for a bank), cross-industry (e.g., payroll processing), or generic (e.g., utility time

EXHIBIT F-1

Information Services Industry Structure—1991



Source: INPUT

sharing). In general, BAS services involve minimal customization by the vendor, and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. The following delivery modes are included under BAS:

- Processing Services
- Applications Software Products
- Turnkey Systems
- *Systems Management Services (SMS)* - services which assist users in developing systems or operating/managing the information systems function. Two key elements of SMS are the customization of the service to each individual user and/or project, and the potential for the vendor to assume significant responsibility for management of at least a portion of the user's information systems function. The following delivery modes are included under SMS:
 - Systems Operations
 - Systems Integration

Each of the remaining three delivery modes represent a separate service category:

- Professional Services
- Network Services
- Systems Software Products

Note: These service categories are a new concept introduced in 1990. They are purely an aggregation of lower-level delivery mode data. They do not change the underlying delivery modes or industry structure.

2. Software Products

There are many similarities between the applications and systems software delivery modes. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's site. Vendor-provided training or support in operation and user of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

Software products have several subcategories, as indicated below and shown in Exhibit B-2.

- Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.
- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.
- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems, and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

- Applications Software Products

- *Industry-Specific Applications Software Products* - Software products that perform functions related to solving business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRP II, medical recordkeeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

EXHIBIT F-2

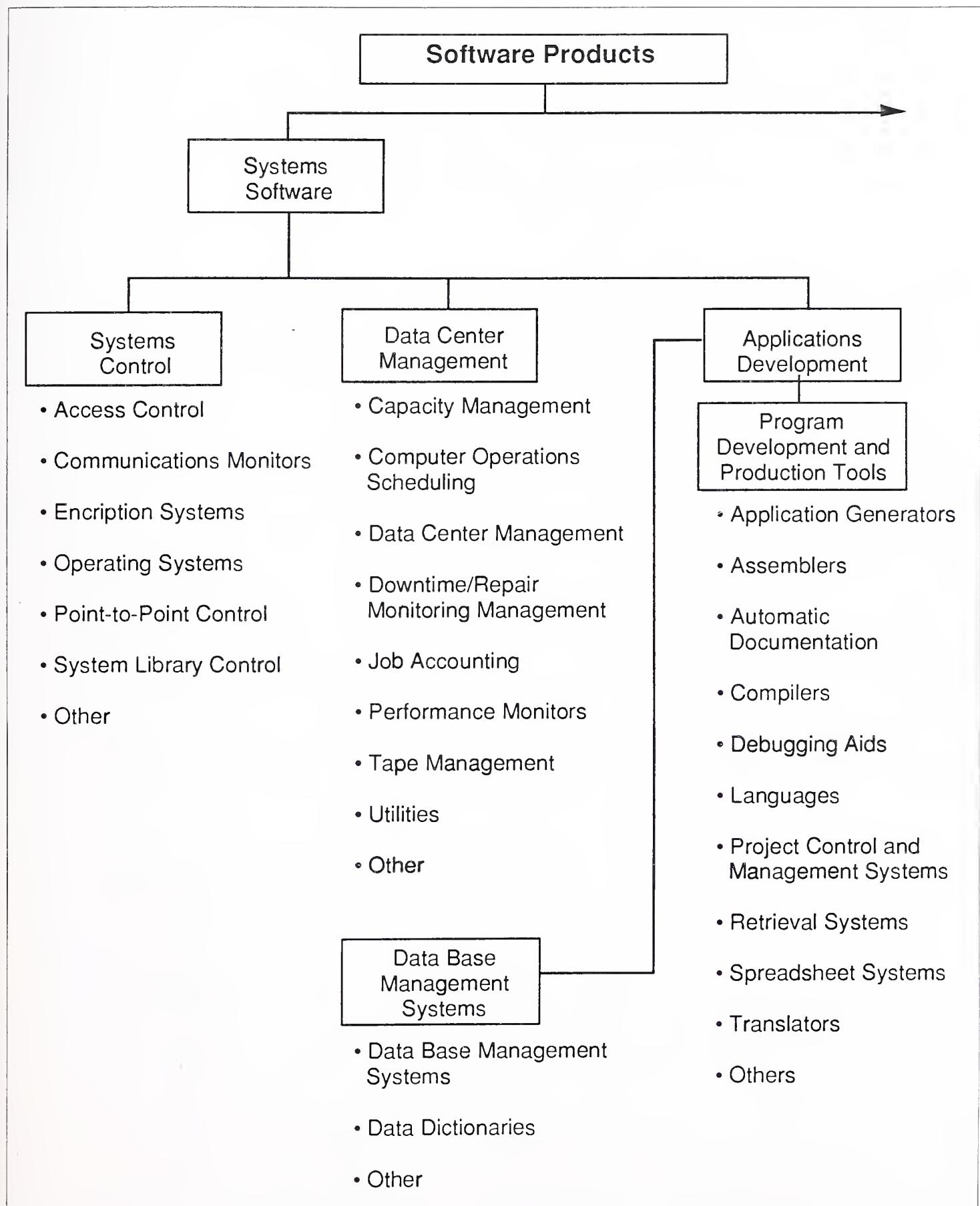
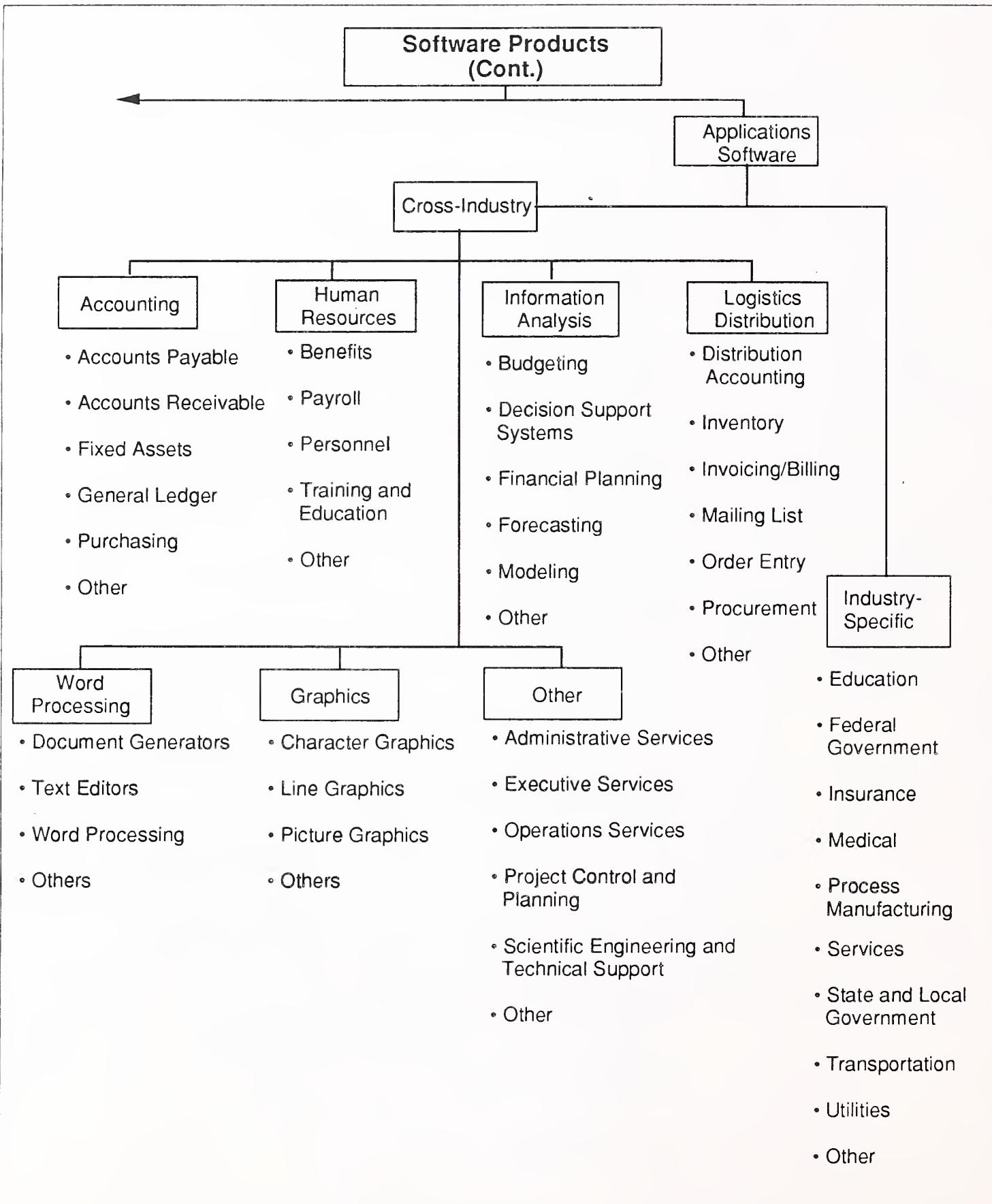


EXHIBIT F-2 (CONT.)



3. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computer and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- **Value-Added Reseller (VAR):** A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually application software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories:

- *Industry-Specific Systems* - systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical recordkeeping, or discrete manufacturing control systems.
- *Cross-Industry Systems* - systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.

4. Processing Services

This category includes transaction processing, utility processing, and other processing services.

- *Transaction Processing:* Client uses vendor-provided information systems—including hardware, software and/or data networks—at vendor site or customer site to process transactions and update client data bases. Transactions may be entered in one of four modes:

- *Interactive* - Characterized by the interaction of the users with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.
- *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.
- *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.
- *Carry-in Batch* - where users physically deliver work to a processing services vendor.
- *Utility Processing*: Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on vendor's system.
- *Other Processing Services*: Vendor provides services—usually at vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

5. Systems Operations

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes:

- *Professional Services*: The vendor provides personnel to operate client-supplied equipment. Prior to 1990, this was a submode of the Professional Services delivery mode.
- *Processing Services*: The vendor provides personnel, equipment and (optionally) facilities. Prior to 1990, this was a submode of the Processing Services delivery mode.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management".

There are two general levels of systems operations:

- Platform/network operations - where the vendor operates the computer system and/or network without taking responsibility for the applications
- Application operations - where the vendor takes responsibility for the complete system, including equipment, associated telecommunications networks, and applications software.

Note: Systems Operations is a new delivery mode introduced in 1990.

6. Systems Integration (SI)

Systems integration is a business offering that provides a complete solution to an information system, networking or automation requirements through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization

- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including
 - System documentation and user training
 - Systems operations during development
 - Systems maintenance
- Financing

7. Professional Services

This category includes consulting, education and training, and software development.

- *Consulting*: services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of information systems, including equipment, software, networks and systems operations.
- *Education and Training*: Products and services related to information systems and services for the professional end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.
- *Software Development*: Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

8. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: Electronic Information Services, which involve selling information to the user, and Network Applications, which involve providing some form of enhanced transport service in support of a user's information processing needs.

- Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.
- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

- *Network Applications*

- *Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards; this software may be provided as part of the VAN service, or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.
- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.

C

Hardware/Hardware Systems

Hardware - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor, and generally cannot be included in other categories such as terminals.
- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.
- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters
- *Communication Devices* - Includes modem, encryption equipment, special interfaces, and error control
- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories

Terminals - Three types of terminals are described below:

- *User Programmable* - Also called intelligent terminals, including the following:
 - Single-station or standalone
 - Multistation, shared processor
 - Teleprinter
 - Remote batch
- User Nonprogrammable
 - Single-station
 - Multistation, shared processor
 - Teleprinter
- *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications

Hardware Systems - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in various forms including:
 - Integrated circuit package
 - Plug-in boards with increased memory and peripheral circuits
 - Console including keyboard and interfacing connectors
 - Personal computer with at least one external storage device directly addressable by the CPU
 - An embedded computer which may take a number of shapes or configurations
- *Workstations* - High-performance, desktop, single-user computers employing (mostly) Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. Typical workstation products are provided by Apollo (now a unit of Hewlett-Packard), Sun, Altos, DEC (the MicroVAX) and IBM. These products usually cost more than \$15,000. However, at this writing many companies have recently announced sizable price cuts.

- *Midsize Systems* - Describe superminicomputers and the more traditional business minicomputers. Due to steadily improving design and technology, the latter have outgrown traditional definitions (which defined small systems as providing 32-bit to 64-bit word lengths at prices ranging from \$15,000 to \$350,000). Increasingly, minicomputers and workstations meet the 32-bit definition, and may go beneath the \$15,000 lower price limit. Typical midrange systems include IBM System/3X, 43XX, AS/400, and 937X product lines, DEC PDP and VAX families (excluding MicroVAX families), and competitive products from a wide range of vendors, including HP, Data General, Wang, AT&T, Prime Concurrent, Gould, Unisys, NCR, Bull, Harris, Tandem, Stratus, and many others.
- *Large Computer* - Presently centered on storage controllers, but likely to become bus-oriented and to consist of multiple processors or parallel processor. Intended for structured mathematical and signal processing and typically used with general purpose, Von Neumann-type processors for system control. This term usually refers to traditional mainframes and supercomputers.
- *Supercomputer* - High-powered processors with numerical processing throughput that is significantly greater than the fastest general purpose computers, with capacities in the 100-500 million floating point operations per second (MFLOPS) range. Newer supercomputers, with burst modes over 500 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-four gigabyte class, are labeled Class V to Class VII in agency long-range plans. Supercomputers fit in one of two categories:
 - Real Time - Generally used for signal processing in military applications
 - Non-Real Time - For scientific use in one of three configurations:
 - Parallel processors
 - Pipeline processor
 - Vector processor
 - *Supercomputer* - Is also applied to micro, mini, and large mainframe computers with performance substantially higher than attainable by Von Neumann architectures.
- *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or

semipermanent interfaces. These systems may vary in capacity from microcomputers to parallel processor computer systems.

D

General Definitions

Analog - Signal or transmission type with continuous waveform representation.

ASCII - American National Standard Code for Information Interchange—Eight-bit code with seven data bits and one parity bit.

Asynchronous - Communications operation (such as transmission) without continuous timing signals. Synchronization is accomplished by appending signal elements to the data.

Bandwidth - Range of transmission frequencies that can be carried on a communications path; used as a measure of capacity.

Baud - Number of signal events (discrete conditions) per second. Typically used to measure modem or terminal transmission speed.

Byte - Usually equivalent to the storage required for one alphanumeric character (i.e., one letter or number).

CBX - Computerized Branch Exchange—A PABX based on a computer system, implying programmability and usually voice and data capabilities.

Central Processing Unit (CPU) - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions.

Centrex - Central office telephone services that permit local circuit switching without installation of customer premises equipment. Could be described as shared PBX service.

Circuit Switching - A process that, usually on demand, connects two or more network stations, and permits exclusive circuit use until the connection is released; typical of the voice telephone network, where a circuit is established between the caller and the called party.

CO - Central Office—Local telco site for one or more exchanges.

CODEC - Coder/decoder—Equivalent to modem for digital devices.

Constant Dollars - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.

Computer System - The combination of computing resources required to perform the designed functions. May include one or more CPUs, machine room peripherals, storage systems, and/or applications software.

CPE - Customer Premises Equipment—DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company CO. May include switchboards, PBX, data terminals, and telephone answering devices.

CSMA/CD - Carrier Sense Multiple Access/Collision Detect—Contention protocol used in local-area networks, typically with a multipoint configuration.

Current Dollars - Estimates or values expressed in current-year dollars which, for forecasts, would include an allowance for inflation.

Data Encryption Standard (DES) - Fifty-six-bit key, one-way encryption algorithm adopted by NIST in 1977, implemented through hardware (“S-boxes”) or software. Designed by IBM with NSA guidance.

Datagram - A self-contained packet of information that does not depend on the contents of preceding or following packets and has a finite length.

DCA - IBM's Document Content Architecture—Protocols for specifying document (text) format which are consistent across a variety of hardware and software systems within IBM's DISOSS.

DCE - Data Circuit-terminating Equipment—Interface hardware that couples DTE to a transmission circuit or channel by providing functions to establish, maintain, and terminate a connection, including signal conversion and coding.

DDCMP - Digital Data Communications Message Protocol—Data link protocol used in Digital Equipment Company's DECNET.

DECNET - Digital Equipment Company's network architecture.

Dedicated Circuit - A permanently established network connection between two or more stations; contrast with switched circuit.

DEMS - Digital Electronic Message Service—Nationwide common carrier digital networks which provide high-speed, end-to-end, two-way transmission of digitally encoded information using the 10.6 GHz band.

DIA - IBM's Document Interchange Architecture—Protocols for transfer of documents (text) between different hardware and software systems within IBM's DISOSS.

Digital - Signal or transmission type using discontinuous, discrete quantities to represent data.

DISOSS - IBM's DIStributed Office Support System—Office automation environment, based on DCA and DIA, which permits document (text) transfer between different hardware and software systems without requiring subsequent format or content revision.

Distributed Data Processing - The development of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's needs.

DTE - Data Terminal Equipment—Hardware which is a data source, link, or both, such as video display terminals that convert user information into data transmission, and reconvert data signals into user information.

EBCDIC - Extended Binary Coded Decimal Interchange Code—Eight-bit code typically used in IBM mainframe environments.

EFT - Electronic funds transfer.

Encryption - Electric, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points.

End User - One who is using a product or service to accomplish his or her own functions. The end user may buy a system from the hardware supplier(s) and do his or her own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.

Engineering Change Notice (ECN) - Product improvements after production.

Engineering Change Order (ECO) - The follow-up to ECNs, including parts and a bill of materials to effect the change in the hardware.

Equipment Operators - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).

Erasable Disk - A type of disk that allows users to erase data previously written. Erasable disks used for applications where data may need to be updated periodically.

Ethernet - Local-area network developed by Xerox PARC using baseband signaling, CSMA/CD protocol, and coaxial cable to achieve a 10 mbps data rate.

Facsimile - Transmission and reception of graphic data, usually fixed images of documents, through scanning and conversion of a picture signal.

FDM - Frequency Division Multiplexing—A multiplexing method that permits multiple access by assigning different frequencies of the available bandwidth to different channels.

FEP - Front-End Processor—Communications concentrator such as the IBM 3725 or COMTEN 3690 used to interface communications lines to host computers.

Field Engineer (FE) - Field engineer, customer engineer, serviceperson, and maintenance person are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Full-Duplex - Bi-directional communications, with simultaneous, two-way transmission.

General Purpose Computer System - A computer designed to handle a wide variety of problems. Includes machine room peripherals, systems software, and small business systems.

Half-Duplex - Bi-directional communications, but only in one direction at a time.

Hardware Integrator - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator also may develop control system software in addition to installing the entire system at the end-user site.

HDLC - High-level Data Link Control.

Hertz - Number of signal oscillations (cycles) per second, abbreviated Hz.

IBM Token Ring - IBM's local-area network using baseband signalling and operating at 4 mbps on twisted-pair copper wire. Actually a combination of star and ring topologies—IEEE 802.5-compatible.

IDN - Integrated Digital Network—Digital switching and transmission; part of the evolution to ISDN.

Independent Suppliers - Suppliers of machine room peripherals, though usually not suppliers of general purpose computer systems.

Information Processing - Data processing as a whole, including use of business and scientific computers.

Installed Base - Cumulative number or value (cost when new) of computers in use.

Interconnection - Physical linkage between devices on a network.

Interoperability - The capability to operate with other devices on a network. Different from interconnection, which merely guarantees a physical network interface.

ISDN - Integrated Services Digital Network—Completely digital, integrated voice and nonvoice public network service. Not clearly defined through any existing standards, although FCC and other federal agencies are developing CCITT recommendations.

Keypunch Operators - Individuals operating keypunch machines (similar to electric typewriters) to transcribe data from source materials onto punch cards.

Lease Line - Permanent connection between two network stations. Also known as dedicated or non-switched line.

Machine Repairers - Individuals who install and periodically service computer systems.

Machine Room Peripherals - Peripheral equipment generally located close to the central processing unit.

Mainframe - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more.

MAP - Manufacturing Automation Protocol—Seven-layer communications standard for factory environments promoted by General Motors/EDS. Adopts IEEE 802.2 and IEEE 802.4 standards plus OSI protocols for other layers of the architecture.

Mean Time to Repair - The mean of elapsed times from the arrival of the field engineer on the user's site to the time when the device is repaired and returned to user service.

Mean Time to Respond - The mean of elapsed times from the user call for services and the arrival of the field engineer on the user's site.

Message - A communication intended to be read by a person. The quality of the received document need not be high, only readable. Graphic materials are not included.

MMFS - Manufacturing Messaging Format Standard—Application-level protocol included within MAP.

Modem - A device that encodes information into electronically transmittable form (MOdulator) and restores it to original analog form (DEModulator).

NCP - Network Control Program—Software used in IBM 3705/3725 FEPs for control of SNA networks.

Node - Connection point of three or more independent transmission points which may provide switching or data collection.

Off-Line - Pertaining to equipment or devices that can function without direct control of the central processing unit.

On-Line - Pertaining to equipment or devices under direct control of the central processing unit.

Optical Disk - Storage device that uses laser technology to record data. Optical disks provide high storage capacity, but cannot be overwritten.

OSI - ISO reference model for Open Systems Interconnection—Seven-layer architecture for application, presentation, session, transport, network, data link, and physical services and equipment.

OSI Application Layer - Layer 7, providing end-user applications services for data processing.

OSI Data Link Layer - Layer 2, providing transmission protocols, including frame management, link flow control, and link initiation/release.

OSI Network Layer - Layer 3, providing call establishment and clearing control through the network nodes.

OSI Physical Layer - Layer 1, providing the mechanical, electrical, functional, and procedural characteristics to establish, maintain, and release physical connections to the network.

OSI Presentation Layer - Layer 6, providing data formats and information such as data translation, data encoding/decoding, and command translation.

OSI Session Layer - Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes.

OSI Transport Layer - Layer 4, providing end-to-end terminal control signals such as acknowledgments.

Overseas - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

PABX - Private Automated Branch Exchange—Hardware that provides automatic (electro-mechanical or electronic) local circuit switching on a customer's premises.

PAD - Packet Assembler-Disassembler—A device that enables DTE not equipped for packet switching operation to operate on a packet switched network.

PBX - Private Branch Exchange—Hardware that provides local circuit switching on the customer premise.

PCM - Pulse-Code Modulation—Modulation involving conversion of a waveform from analog to digital form through coding.

PDN - Public Data Network—A network established and operated by a recognized private operating agency, a telecommunications administration, or other agency for the specific purpose of providing data transmission services to the public.

Peripherals - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.

PPM - Pulse Position Modulation.

Private Network - A network established and operated for one user or user organization.

Programmers - Persons mainly involved in designing, writing, and testing computer software programs

Protocols - The rules for communication system operation that must be followed if communication is to be effected. Protocols may govern portions of a network or service. In digital networks, protocols are digitally encoded as instructions to computerized equipment.

Public Network - A network established and operated for more than one user with shared access, usually available on a subscription basis. See related international definition of PDN.

Read-Only - A type of disk that is prerecorded and can be used for retrieving data. A read-only disk cannot be overwritten. A read-only system will retrieve and display stored data, but the system cannot alter the stored data.

Read/Write - A type of disk that can be read and written upon. A read/write system will read and display stored data and alter data already recorded.

Scientific Computer System - A computer system designed to process structured mathematics (such as Fast Fourier Transforms), and complex, highly redundant information (such as seismic data, sonar data, and radar), with large, on-line memories and very high-capacity output.

SDLC - Synchronous Data Link Control—IBM's data link control for SNA. Supports a subset of HDLC modes.

SDN - Software-Defined Network.

Security - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent or unauthorized disclosure to meet the requirements of the Privacy Act and national classified information regulations

Service Delivery Point - The location of the physical interface between a network and customer/user equipment

Simplex - Unidirectional communications.

Smart Box - A device for adapting existing DTE to new network standards such as OSI. Includes PADs and protocol convertors, for example.

SNA - Systems Network Architecture—Seven-layer communications architecture designed by IBM. Layers correspond roughly but not exactly to OSI model.

Software - Computer programs

Supplies - Includes materials associated with the use of operations of computer systems, such as printer paper, keypunch card, disk packs, and tapes.

Switched Circuit - Temporary connection between two network stations established through dial-up procedures.

Synchronous - Communications operation with separate, continuous clocking at both sending and receiving stations.

Systems Analyst - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

Systems House - Vendor that acquires, assembles, and integrates hardware and software into a total system to satisfy the data processing requirements of an end user. The vendor also may develop systems software products for license to end users. The systems house vendor does not manufacture mainframes.

Systems Integrator - Systems house vendor that develops systems interface electronics, applications software, and controllers for the CPU, peripherals, and ancillary subsystems which may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and testing of the completed system.

T1 - Bell System designation for 1.544 mbps carrier capable of handling 24 PCM voice channels.

TDM - Time Division Multiplexing—A multiplexing method that interleaves multiple transmissions on a single circuit by assigning a different time slot to each channel.

Token Passing - Local-area network protocol which allows a station to transmit only when it has the “token,” an empty slot on the carrier.

TOP - Technical Office Protocol—Protocol developed by Boeing Computer Services to support administrative and office operations as complementary functions to factory automation implemented under MAP.

Turnkey System - System composed of hardware and software integrated into a total system designed to fulfill completely the processing requirements of a single application.

Twisted-Pair Cable - Communications cabling consisting of pairs of single-strand metallic electrical conductors, such as copper wires, typically used in building telephone wiring and some LANs.

Verification and Validation - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user.

Voice-Grade - Circuit or signal in the 300-3300 Hz bandwidth typical of the public telephone system, nominally a 4 KHz user.

VTAM - Virtual Telecommunications Access Method—Host-resident communications software for SNA networks.

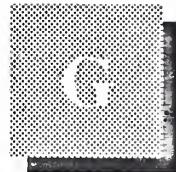
WORM - Write-Once, Read-Many—A type of disk that can be created one time. Once written on, the disk can only be read—otherwise data will be destroyed.

Write-Once - A type of disk that can be created one time. Once written on, the disk can only be read. It cannot be rewritten.

E

Other Considerations

When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures are then categorized according to the users' perception of the purchase.



Status of ANSI X.12 and EDIFACT Documents

UNCID, Uniform Rules of Conduct for Interchange of Trade Data by Teletransmissions

UN/EDIFACT Syntax Implementation Guidelines

UN/EDIFACT Message Design Guidelines

UN/EDIFACT Messages at Status 2 for 1991

- CREADV Credit Advice
- CREEXT Extended Credit Advice
- CUSCAR Customs Cargo Report
- CUSDEC Customs Declaration
- CUSREP Customs Conveyance Report
- CUSRES Customs Response
- DEBADV Debit Advice
- IFTMAN Arrival Notice
- IFTMBC Booking Confirmation
- IFTMBF Firm Booking
- IFTMBP Provisional Booking
- IFTMCS Instruction Contract Status
- IFTMFR International Forwarding Framework
- IFTMIN Shipping Instructions

- INVOIC Commercial Invoice
- ORDERS Purchase Order
- PAYEXT Extended Payment Order
- PAYORD Payment Order
- REMADV Remittance Advice

UN/EDIFACT 1991 Status 2 Data Segments Directory

UN/EDIFACT 1991 Status 2 Composites Directory

UN/EDIFACT 1991 Status 2 Data Elements Directory

UN/EDIFACT 1991 Status 2 Code Lists

UN/EDIFACT Messages at Status 1 for 1991

BAPLIE	Bayplan including Empty Space	IFTMBP	Provisional Booking
BAPLTE	Bayplan Number Only	IFTMCS	Instruction Contract Status
***CONTROL	Acknowledgement/Rejection Advice	IFTMFR	International Forwarding Framework
CREADV	Credit Advice	IFTMIN	Shipping Instructions
CREEEXT	Extended Credit Advice	INVOIC	Commercial Invoice
CUSCAR	Customs Cargo Report	ORDCHG	Purchase Order Change Request
CUSDEC	Customs Declaration	ORDERS	Purchase Order
CUSRES	Customs Response	PARTIN	Party Information
DEBADV	Debit Advice	PAYEXT	Extended Payment Order
DELFOR	Delivery Schedule	PAYORD	Payment Order
DELJIT	Just-in-Time Delivery	PRICAT	Price Catalog

***This message is not aligned or compatible with the other messages and supporting directories at Status 1 for 1991, and carries its own supporting directories.

DESADV	Despatch Advice	QALITY	Quality Data
DOCAPP	Documentary Credit Application	QUOTES	Quote
IFCSUM	Forwarding and Consolidations	REMADV	Remittance Advice
IFTMAN	Arrival Notice	REQOTE	Request for Quote
IFTMBC	Booking Confirmation	STATAAC	Statement of Account
IFTMBF	Firm Booking		

UN/EDIFACT 1991 Status 1 Data Segments Directory

UN/EDIFACT 1991 Status 1 Composites Directory

UN/EDIFACT 1991 Status 1 Data Elements Directory

UN/EDIFACT 1991 Status 1 Code Lists

ACS X.12 Standards Activities—A Quick Summary

In Development = Assigned to subcommittee for work

In Comment Resolution = Balloted by ASC X12/comments were received.

The following codes indicate the version, release, and subrelease (if applicable) in which the standard first appeared. It appears in each subsequent publication.

V2/RO - Version 2, Release 1 American National Standards 1986-87

V2/R2 - Version 2, Release 2 1988

V2/R3 - Version 2, Release 3, April 1989

V2/R4 - Version 2, Release 4, December 1989

V2/R4/S1 - Version 2, Release 4, Subrelease 1, February 1990

V2/R4/S2 - Version 2, Release 4, Subrelease 2, June 1990

V3/R1 - Version 3, Release 1, December 1990

V3/R1/S1 - Version 3, Release 1, Subrelease 1, February 1991

V3/R1/S2 - Version 3, Release 1, Subrelease 2, June 1991

V3/R2 - Version 3, Release 2, December 1991

Draft Standards for Trial Use

ID#	Ref#	Title	Availability Status
104	X12.100	Air Shipment Information	V3/R1/S2
110	X12.101	Air Freight Details and Invoice	V3/R1/S2
114	X12.102	Air Shipment Status Message	V3/R1/S2
120	X12.70	Vehicle Shipping Order	In development
121	X12.71	Vehicle Service	In development
125	X12.75	Multilevel Railcar Load Details	In development
126	X12.76	Vehicle Application Advice	In development
127	X12.77	Vehicle Baying Order	In development
128	X12.78	Dealer Information	In development
129	X12.79	Vehicle Rate Update	In development
130	X12.89	Student Educational Record (Transcript)	In commercial resolution
131	X12.90	Student Academic Record (Transcript) Acknowledgment	In development
132	X12.91	Cause and Corrective Action Reporting	In development
133	X12.92	Criminal Incident Summary	In development
134	X12.93	Version/Release Usage Notification	In development
135	X12.198	Student Loan Application	In development
136	X12.199	Mortgage-Backed Security Trading Data	In development
137	X12.257	Request for Cause and Corrective Action Report	In development
138	X12.258	Response to Request for Cause and Corrective Action Report	In development
139	X12.265	Student Loan Guarantee Result	In development
140	X12.200	Warranty Registration	In development
141	X12.201	Product Warranty Claim Response	In development
142	X12.202	Product Warranty Claim	In development
143	X12.203	Product Service Notification	In development
150	X12.204	Tax Rate Schedule	In development
151	X12.205	Electronic Filing of Tax Return Data Acknowledgment	In development
152	X12.206	Statistical Government Information	In development
160	X12.207	Transportation Automatic Equipment Identification	In development
161	X12.72	Train Sheet	In development
162	X23.73	Equipment Repair Billing	In development
170	X12.210	Box Office Statement	In comment resolution

180	X12.255	Return Merchandise Authorization and Notification	In development
185	X12.266	Royalty Regulatory Report	In development
190	X12.264	Student Enrollment Verification	In development
195	X12.267	Federal Communications Commission (FCC) License Application	In development
204	X12.103	Motor Carrier Shipment Information	V3/R1/S2
210	X12.104	Motor Carrier Freight Details and Invoice	V3/R1/S2
213	X12.105	Motor Carrier Shipment Status Inquiry	V3/R1/S2
214	X12.106	Motor Carrier Shipment Status Message	V3/R1/S2
217	X12.107	Motor Carrier Loading and Route Guide	V3/R1/S2
218	X12.108	Motor Carrier Tariff Information	V3/R1/S2
300	X12.109	Reservation (Booking Request) (Ocean)	In comment resolution
301	X12.110	Confirmation (Ocean)	In comment resolution
303	X12.112	Booking Cancellation (Ocean)	In comment resolution
304	X12.113	Shipping Instructions (Ocean)	In comment resolution
309	X12.117	U.S. Customs Manifest (Ocean)	In comment resolution
310	X12.118	Freight Details and Invoice (Ocean)	In comment resolution
311	X12.268	Canadian Customs Information	In comment resolution
312	X12.119	Arrival Notice (Ocean)	In comment resolution
313	X12.120	Shipment Status Inquiry (Ocean)	In comment resolution
315	X12.122	Status Details (Ocean)	In comment resolution
322	X12.127	Terminal Operations Activity (Ocean)	In comment resolution
323	X12.128	Vessel Schedule and Itinerary (Ocean)	In comment resolution
324	X12.129	Vessel Stow Plan (Ocean)	In comment resolution
325	X12.208	Consolidation of Goods in Container	In comment resolution
330	X12.259	Ocean Tariff Filing Organization	In development

331	X12.260	Ocean Tariff Information	In development
350	X12.130	U.S. Customs Release Information (Ocean)	In comment resolution
352	X12.131	U.S. Customs Carrier General Order Status (Ocean)	In comment resolution
353	X12.132	U.S. Customs Master In-Bond Arrival (Ocean)	V3/R1/S2
354	X12.133	U.S. Customs Automated Manifest Manifest Archive Status (Ocean)	In comment resolution
355	X12.134	U.S. Customs Manifest Rejection (Ocean)	In comment resolution
356	X12.211	Permit to Transfer Request (Ocean)	In development
361	X12.136	Carrier Interchange Agreement (Ocean)	In comment resolution
400	X12.74	Shipper's Rail Car Order	In development
404	X12.138	Rail Carrier Shipment Information	In comment resolution
410	X12.139	Rail Carrier Freight Details and Invoice	In comment resolution
411	X12.140	Rail Freight Details and Invoice Summary	In comment resolution
412	X12.80	Trailer/Container Repair Billing	In development
413	X12.81	Trainer/Container Repair Billing Exceptions	In development
414	X12.83	Rail Carhire Settlements	V3/R1/S2
417	X12.141	Rail Carrier Waybill Interchange	In comment resolution
418	X12.142	Rail Advance Interchange Consist	In comment resolution
419	X12.143	Advance Car Disposition	In comment resolution
420	X12.144	Car Handling Information	In comment resolution
421	X12.261	Car Scheduling and Estimated Time of Arrival	In development
422	X12.262	Shipper's Car Order	In development
425	X12.149	Rail Waybill Request	In comment resolution
416	X12.150	Rail Revenue Waybill	V3/R1/S2
417	X12.151	Rail Waybill Response	In comment resolution
429	X12.35	Railroad Retirement Activity	In comment resolution
430	X12.82	Interline Settlements Accounting	In comment resolution

431	X12.65	Railroad Station Master File	In comment resolution
440	X12.152	Shipment Weights	In comment resolution
460	X12.153	Rate Format Docket Data, Part 1	In comment resolution
461	X12.154	Rate Format Docket Data, Part 2	In comment resolution
462	X12.155	Rate Format Docket Data, Part 3	In comment resolution
463	X12.156	Rate Docket Data, Part 1	In comment resolution
464	X12.157	Rate Docket Data, Part 2	In comment resolution
465	X12.158	Rate Docket Data, Part 3	In comment resolution
466	X12.159	Rate Request	V3/R1/S2
467	X12.160	Scale Rate Format Docket Data	In comment resolution
468	X12.161	Rate Docket Journal Log	V3/R1/S2
469	X12.162	Rate Docket Distribution Authority	In comment resolution
480	X12.163	Rail Rate Group Terminator	In comment resolution
485	X12.164	Ratemaking Action	V3/R1/S2
486	X12.165	Rate Docket Expiration	In comment resolution
490	X12.166	Rate Group Definition	V3/R1/S2
491	X12.167	Rate Adjustment	In comment resolution
492	X12.168	Miscellaneous Rates	V3/R1/S2
494	X12.169	Scale Rate Table	V3/R1/S2
499	X12.170	Application Acceptance/Rejection Advice	In comment resolution
508	X12.222	Statement of Interfund	In development
509	X12.223	DoD Invoice Adjustment Request/Reply	In development
510	X12.224	DoD Invoice	In development
511	X12.225	Requisition	In development
514	X12.228	Requisition Status	In development
515	X12.233	Material Returns Program	In development
516	X12.229	Material Release	In development
517	X12.230	Material Obligation Validation	In development
518	X12.235	Passing, Referral and Distribution Order	In development
519	X12.236	Disposal Shipment Confirmation and Follow-up	In development

520	X12.253	Foreign Military Sales Notices of Availability	In development
521	X12.221	Supply Source Cancellation	In development
522	X12.220	Inventory Control Point Procurement	
523	X12.237	Document Modifier	In development
527	X12.231	Supply Assistance Request	In development
528	X12.238	Material Due-in and Receipt	In development
529	X12.241	Special Program Requirement	In development
530	X12.242	Logistics Asset Support	In development
531	X12.239	Logistics Reassignment Data	In development
532	X12.244	Asset Reclassification	In development
533	X12.245	Issue, Backorder and Demand	In development
534	X12.246	Inventory Adjustment	In development
535	X12.249	Physical Inventory	In development
		Small Arms Serial Number Registration and Report	
536	X12.243	Logistics Reassignment Management Information	In development
537	X12.247	Asset Status/Transaction Reporting Request/Reply	In development
538	X12.234	War Material Requirements	In development
539	X12.250	Freeze/Unfreeze Action	In development
540	X12.251	Transaction History	In development
541	X12.248	Storage Item Data	
		Correction/Changes	
542	X12.232	Material Receipt	
		Acknowledgment	In development
544	X12.240	Asset Status Reporting within Distribution System	In development
545	X12.252	Location Reconciliation Request	In development
561	X12.212	DoD Contract Abstract	In development
562	X12.213	DoD Contract Abstract Cancellation/Acknowledgment	
565	X12.216	DoD Contract Shipment Performance Notice	In development
566	X12.217	DoD Contract Acceptance Alert/Report	In development
567	X12.218	DoD Contract Completion Status	In development
568	X12.219	DoD Contract Payment Notice	In development
622	X12.173	Intermodal Ramp Activity	In comment resolution
715	X12.263	Group Loading Plan	In development
805	X12.195	Contract Proposal	In development
806	X12.196	Project Schedule Reporting	In comment resolution
810	X12.2	Invoice	V2/RO
811	X12.39	Consolidated Service Invoice/Statement	V3/R1/S2
812	X12.40	Credit/Debit Adjustment	V3/R1/S1
813	X12.62	Electronic Filing of Tax Return Data	In development

814	X12.61	Residential Mortgage Loan Application	In development
815	X12.42	Cryptographic Service Message	V3/R1/S1
816	X12.66	Organization Relationship	In development
818	X12.256	Commission Sales Report	In development
819	X12.43	Operating Expense Statement	V2/R3
820	X12.4	Payment Order/Remittance Advice	V2/R1
821	X12.24	Financial Information Reporting	V2/R4
822	X12.25	Customer Account Analysis	V2/R3
823	X12.38	Lockbox	V2/R2
824	X12.44	Application Advice	V2/R4/S2
825	X12.46	Payment Status Report	In comment resolution
826	X12.19	Tax Information Reporting	V2/R4/S2
827	X12.47	Financial Return Notice	V2/R4/S1
828	X12.45	Debit Authorization	In comment resolution
829	X12.48	Payment Cancellation Request	V2/R4/S1
830	X12.14	Planning Schedule with Release Capability	V2/R0
831	X12.49	Control Totals	In comment resolution
832	X12.13	Price/Sales Catalog	V2/R0
833	X12.69	Residential Mortgage Credit Report Order	In development
834	X12.84	Health Care Enrollment and Maintenance	In comment resolution
835	X12.85	Health Care Claim Payment/Advice	In comment resolution
836	X12.54	Contract Award	V3/R1
837	X12.86	Health Care and Disability Insurance Claim	In development
838	X12.17	Trading Partner Profile	In comment resolution
839	X12.31	Project Cost Reporting	In comment resolution
840	X12.7	Request for Quotation	V2/RO
841	X12.51	Specifications/Technical Information	V3/R1
842	X12.21	Nonconformance Report	V3/R1
843	X12.8	Response to Request for Quotation	V2/R0
844	X12.26	Product Transfer Account Adjustment	V2/R3
845	X12.27	Price Authorization Acknowledgment/Status	V2/R3
846	X12.28	Inventory/Inquiry Advice	V2/R1
847	X12.63	Material Disposition	In development
848	X12.36	Material Safety Data Sheet	V3/R1/S1
849	X12.50	Response to Product Transfer Account Adjustment	V2/R3
850	X12.1	Purchase Order	V2/RO
851	X12.88	Lease Schedule	In comment resolution
852	X12.52	Product Activity Data	V3/R1
853	X12.64	Routing and Carrier Instruction	In comment resolution

854	X12.68	Shipment Delivery Discrepancy Information	In comment resolution
855	X12.9	Purchase Order Acknowledgment	V2/R0
856	X12.10	Ship Notice/Manifest	V2/R0
857	X12.29	Shipment and Billing Notice	In comment resolution
858	X12.18	Shipment Information	V2/R4
859	X12.55	Freight Invoice	V2/R4/S2
860	X12.15	Purchase Order Change Request—Buyer Initiated	V2/R0
861	X12.12	Receiving Advice/Acceptance Certificate	V2/R0
862	X12.37	Shipping Schedule	V2/R2
863	X12.41	Report of Test Results	V2/R3
864	X12.34	Text Message	V2/R4
865	X12.16	Purchase Order Change Acknowledgment Request—Seller Initiated	V2/R0
866	X12.57	Production Sequence	V2/R4/S1
867	X12.33	Product Transfer and Resale Report	V2/R2
868	X12.30	Electronic Form Structure	V2/R4/S2
869	X12.11	Order Status Inquiry	V2/R2
870	X12.23	Order Status Report	V2/R2
871	X12.87	Reliability Data	In development
872	X12.53	Residential Mortgage Insurance Application	In comment resolution
878	X12.182	Product Authorization/Deauthorization	In comment resolution
879	X12.60	Price Change	V3/R1/S2
888	X12.269	Item Maintenance	In comment resolution
889	X12.183	Promotion Announcement	In comment resolution
891	X12.184	Promotion Announcement Change	In comment resolution
892	X12.185	Promotion Announcement Confirmation and Confirmation Change	In comment resolution
893	X12.197	Item Information Request	In development
894	X12.186	Delivery/Return Base Record	In comment resolution
895	X12.187	Delivery/Return Acknowledgment and/or Adjustment	In comment resolution
896	X12.188	Product Dimension Maintenance	In comment resolution
920	X12.174	Loss or Damage Claim for General Commodities	In comment resolution
924	X12.175	Loss or Damage Claim for Motor Vehicle	In comment resolution
925	X12.176	Claim Tracer	In comment resolution

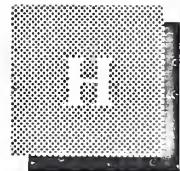
926	X12.177	Claim Status Report and Tracer Reply	In comment resolution
928	X12.178	Automotive Inspection Detail	In comment resolution
940	X12.189	Warehouse Shipping Order	In comment resolution
942	X12.190	Warehouse Activity Report	In comment resolution
943	X12.191	Warehouse Stock Transfer Shipment Advice	In comment resolution
944	X12.192	Warehouse Stock Receipt Advice	In comment resolution
945	X12.945	Warehouse Shipping Advice	In comment resolution
947	X12.194	Warehouse Inventory Adjustment Advice	In comment resolution
980	X12.179	Functional Group Totals	In comment resolution
990	X12.180	Response to a Load Tender	V3/R1/S2
996	X12.32	File Transfer	In comment resolution
997	X12.20	Functional Acknowledgment	V2/R0
998	X12.181	Set Cancellation	In comment resolution
	X12.3	Data Element Dictionary	V2/R0
	X12.5	Interchange Control Structures	V2/R0
	X12.6	Application Control Structure	V2/R0
	X12.22	Segment Directory	V2/R0
	X12.56	Interconnect Mailbag Control Structures	V3/R1/S2
	X12.58	Security Structures	V3/R1/S1
	X12.59	Semantic Support	In development
	X12.254	Control Structures for Interactive EDI	In development
	X12.270	Relational Control Structures	In development

Guidelines

ID#	Title	Availability Status
ASC X12/88-035	Transfer of X12 Data Using Asynchronous or Binary Synchronous Communication Protocols Guideline	1987
ASC X12S/89-736	EDI Asynchronous Guideline	1989
ASC X12C/89-535	Types of Names and Addresses in X12 Guideline	In comment resolution
ASC X12C/89-525	Compliance with X12 Guideline	1990
ASC X12J/TG1/90-95	ASC X12 Design Rules and Guidelines	(Revised 1991)
ASC X12D/TG1/90-856	EDI Implementation Guideline Reference Material	1991
ASC X12C/TG8/90-859	Model of X12 Functional Guideline	1991
ASC X12C/TG3/90-037	Standard Data for Interconnect Guideline	In development
ASC X12C/TG3/90-038	EDI Network for Interconnect Questionnaire	In development
ASC X12E/90-657	EDI Business Model for Total Quality Management (TQM)	In comment resolution
(None)	Implementation Guideline for Payment Order/Remittance Advice (820)	In development
(None)	Implementation Guideline for X12.58 Security Structures	In development
(None)	Material Safety Data Sheet Transaction Set (848) Implementation Guideline	In development
(None)	Report of Test Results Transaction Set (863) Implementation Guidelines for Government-Required Test Reporting	
(None)	Specifications/Technical Information Transaction Set (841) Implementation Guideline	In development
(None)	Guideline for Mapping X12 Interchange Structure to X.400	In development
(None)	Implementation Guideline for X12.56 Interconnect Mailbag Control Structures	In development
(None)	Implementation Guideline for X12.20 Functional Acknowledgment Transaction Set (997)	In development

Interpretations

ID#	Title	Availability Status
ASC X12C/89/254	Interpretation of R Data Type	V3/R1
ASC X12C/90-474	Interpretation of ID Data Type	V3/R1/S2
ASC X12C/91-112	Interpretation of Functional Acknowledgment	In comment resolution
ASC X12C/90-659	Interpretation of Routing Reference in X12.5	In comment resolution
ASC X12K/91-140	Interpretation of MEA for Shipping Tolerances	In comment resolution
(None)	Interpretation of "Areas" of a Transaction Set	In development
(None)	Interpretation of End-to-End Interchange	In development
(None)	Interpretation of Version/Release for Control Segments	In development
(None)	Interpretation of X12.6 TM Data Type	In development



Federal Information Processing Standards Publication 161

Federal Information Processing Standards Publication 161

56 *Federal Register* 13123 (March 29, 1991)

Announcing the Standard for *ELECTRONIC DATA INTERCHANGE (EDI)*

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology after approval by the Secretary of Commerce pursuant to Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235.

1. Name of Standard. Electronic Data Interchange (EDI) (FIPS PUB 161).

2. Category of Standard. Software Standard, Electronic Data Interchange.

3. Explanation. This publication announces the adoption, as a Federal Information Processing Standard, of recognized national and international standards for EDI. In EDI, data that would be traditionally conveyed on paper documents are transmitted or communicated electronically according to established rules and formats. The data that are associated with each type of functional document, such as a purchase order or invoice, are transmitted together as an electronic message. The formatted data may be transmitted from originator to recipient via telecommunications or physically transported on electronic storage media.

EDI typically implies a sequence of messages between two parties, for example, buyer and seller, either of whom may serve as originator or recipient. Messages from buyer to seller could include, for example, the data necessary for request for quotation (RFQ), purchase order, receiving advice, and payment advice; messages from seller to buyer could similarly include the data for response to RFQ, purchase order acknowledgment, shipping notice, and invoice.

Implementation of EDI requires the use of a family of interrelated standards. The family must include standards for types of messages (also called "transaction sets"), and for transmission envelopes, data elements, and short sequences of data elements called data segments. A message or transaction set standard defines the sequence of data segments that constitute that message or transaction set. The data segment directory lists all data segments, and defines the

identifier and sequence of data elements constituting each. The data element dictionary provides the specifications of all data elements. Transmission envelopes provide control information about the included messages to the carrying and receiving systems. The standardization of message formats, and of data segments and elements within the messages, makes possible the assembling, disassembling, and processing of the messages by computer.

This FIPS PUB adopts, with specific conditions, the families of standards known as X12 and EDIFACT. This FIPS PUB does not mandate the implementation of EDI systems within the Federal Government; rather it requires the use of X12 or EDIFACT, subject to the conditions specified below, when Federal departments or agencies implement EDI systems. The X12 and EDIFACT standards have been developed respectively by Accredited Standards Committee X12 on Electronic Data Interchange (ASC X12), accredited by the American National Standards Institute, and by the United Nations Economic Commission for Europe—Working Party (Four) on Facilitation of International Trade Procedures (UN/ECE/WP.4). Technical input from the United States in the development of EDIFACT is through the North American EDIFACT Board (NAEB) which is a standing task group of ASC X12.

4. Approving Authority. Secretary of Commerce.

5. Maintenance Agency. U.S. Department of Commerce, National Institute of Standards and Technology (NIST), Computer Systems Laboratory.

6. Cross Index and Related Documents.

6.1 Cross Index

- FIPS PUB 146, Government Open Systems Interconnection Profile (GOSIP), August, 1988.
- FIPS PUB 113, Computer Data Authentication, May, 1985.
- FIPS PUB 65, Guideline for Automated Data Processing Risk Analysis, August, 1979.
- FIPS PUB 46-1, Data Encryption Standard, January, 1988.

6.2 Related Documents.

- NIST Special Publication 500-177, Stable Implementation Agreements for Open Systems Interconnection Protocols, Version 3, December, 1989.
- CCITT Recommendation X.400-1984, Message Handling Systems: System Model—Service Elements, and related documents of this series. (The CCITT Recommendations are available from Omnicom, Vienna, VA; phone: 703-281-1135).
- CCITT Recommendation X.400-1988, Message Handling, System and Service Overview, and related documents of this series.

7. Objectives. The primary objectives of this standard are: a. to promote the achievement of the benefits of EDI: reduced paperwork, fewer transcription errors, faster response time for procurement and customer needs, reduced inventory requirements, and more timely payment of vendors; b. to ease the interchange of data sent via EDI by the use of standards for data formats and transmission envelopes; c. to minimize the cost of EDI implementation by preventing duplication of effort.

8. Applicability.

8.1 Conditions of Application. This standard is applicable to the interchange of data on a particular subject, between a Federal agency and another organization (which may be another Federal agency), if: (1) the data are to be transmitted electronically, and; (2) X12 transaction sets or EDIFACT messages meeting the data requirements of the Federal agency for the subject of the interchange have been developed and approved under the conditions set forth in this FIPS PUB.

8.2 Use of GOSIP. FIPS PUB 146 (GOSIP) specifies a set of open systems interconnection (OSI) protocols for computer networking that are intended for acquisition and use by Federal agencies. The use of those protocols to transmit EDI documents is a planned addition to GOSIP requirements and will be included in a future version of the GOSIP standard. EDI transmission via telecommunications shall use these OSI protocols to transmit EDI documents at such time when GOSIP has been revised to include protocols for EDI.

In the interim, Federal agencies may (but are not required to) transfer EDI documents using Message Handling Systems (MHS) implementations built in conformance with the CCITT 1984 Recommendations. See section 7.12.5 of the NIST Stable Implementation Agreements for Open Systems Interconnection Protocols, Version 3, for the recommended procedures.

8.3 Subject Matter. Primary applicability of this FIPS PUB on EDI is to business information exchanged by trading partners with extensions to government concerns, as that is the subject matter of current X12 and EDIFACT standards and development activities. Business information encompasses the entire range of information associated with commercial, financial, and industrial transactions, and with field unit supply. Examples of applications (not necessarily the subject of current standards) are:

- a. **vendor search and selection:** price/sales catalogs, bids, proposals, requests for quotations, notices of contract solicitation, debarment data, trading partner profiles;
- b. **contract award:** notices of award, purchase orders, purchase order acknowledgments, purchase order changes;
- c. **product data:** specifications, manufacturing instructions, reports of test results, safety data;
- d. **shipping, forwarding, and receiving:** shipping manifests, bills of lading, shipping status reports, receiving reports;
- e. **customs:** tariff filings, customs declarations;
- f. **payment information:** invoices, remittance advices, payment status inquiries, payment acknowledgments;
- g. **inventory control:** stock level reports, resupply requests, warehouse activity reports;
- h. **maintenance:** service schedules and activity, warranty data;
- i. **tax-related data:** tax information and filings;
- j. **insurance-related data:** claims submitted, claims approved.

8.4 Additional Applicability. This standard also is applicable to the electronic interchange of formatted data, between a Federal agency and another organization, concerning (1) a type of subject matter undergoing standardization for which no X12 or EDIFACT standards have yet been approved or for which the current standards fail to meet agency requirements, or of (2) a type of subject matter that ASC X12 or UN/ECE/WP.4 have not yet considered for standardization. For the immediate future, the latter includes subject matter such as environmental or natural resource status; criminal justice; administrative, demographic, economic, educational, or health statistics; Government facility status; etc.

8.4.1. Federal agencies deciding to employ electronic interchange of data for case (1) above (standards available or under development but not meeting agency requirements) shall explicitly submit their requirements for X12 and EDIFACT standardization,

either directly to ASC X12 or NAEB (contact Manager, Standards Maintenance, Data Interchange Standards Association, see Subsection 9.1 for address and phone), or through the auspices of NIST.

8.4.2. Agencies deciding to employ electronic interchange of data for case (2) above (subject matter not yet considered for standardization) are encouraged to submit their requirements for standardization and to use current X12 and/or EDIFACT standards to the extent possible. Use of X12 or EDIFACT should achieve the benefits of standard envelope processing protocols, and standard data elements, segments, and procedural rules and guidelines. Agencies so doing would then be in a better position to adopt the appropriate X12 or EDIFACT standards, should such be considered and approved at a later date.

9. Specifications. Documents are available that define the standard X12 transaction sets and EDIFACT messages as well as the underlying standards for both families. Developments are continuing in both families of standards.

9.1 Source of Documents. Documents defining both the X12 and EDIFACT families of standards are available from the Data Interchange Standards Association (DISA), or from a contractor named by DISA. DISA serves as the secretariat for ASC X12 and the NAEB, and its address and phone number is as follows:

Address: 1800 Diagonal Road—Suite 355, Alexandria, VA 22314

Phone: (703) 548-7005

9.2 X12 Documents. Underlying standards for X12 include:

- X12.3 Data Element Dictionary
- X12.5 Interchange Control Structure
- X12.6 Application Control Structure
- X12.22 Data Segment Directory

X12 transaction sets include the following (not a complete list); additional transaction sets are continually being identified, developed, and submitted for standardization:

- X12.1 Purchase Order (850)
- X12.2 Invoice (810)
- X12.4 Payment Order/Remittance Advice (820)
- X12.7 Request For Quotation (840)
- X12.8 Response To Request For Quotation (843)
- X12.9 Purchase Order Acknowledgment (855)
- X12.10 Ship Notice/Manifest (856)
- X12.11 Order Status Inquiry (869)

- X12.12 Receiving Advice (861)
- X12.13 Price/Sales Catalog (832)
- X12.14 Planning Schedule With Release Capability (830)
- X12.15 Purchase Order Change (860)
- X12.16 Purchase Order Change Request Acknowledgment (865)
- X12.20 Functional Acknowledgment (997)

9.3 EDIFACT Documents. Underlying standards for EDIFACT include:

International Standard ISO 9735: Electronic Data Interchange For Administration, Commerce And Transport (EDIFACT)—Application Level Syntax Rules

UN/TDID Trade Data Interchange Directory, consisting of the following components:

- UN/EDIFACT Syntax Implementation Guidelines
- UN/EDIFACT Message Design Guidelines
- UN/EDIFACT Data Elements Directory—EDED
- UN/EDIFACT Code List Directory—EDCL
- UN/EDIFACT Segments Directory—EDSD
- UN/EDIFACT Composites Directory—EDCD
- UN/EDIFACT Message Directory—EDMD

UNCID Uniform Rules of Conduct for Interchange of Trade Data by Teletransmission

EDIFACT messages (United Nations Standard Messages—UNSMs) include the following; additional messages are continually being identified, developed, and submitted for standardization:

- Invoice Message—INVOICE
- Purchase Order Message—ORDERS

9.4 Versions of Documents. Dates of issue have not been stated for the documents listed above, since the documents are subject to periodic update and revision.

X12 documents are identified by version number; updates are identified by release number. The 1983 standards are referred to as Version 001; the 1986 standards are Version 002. Release 010 to Version 003 was published in December, 1990. ASC X12 plans an annual release. In each X12 transmission, the utilized version and release values are transmitted at a particular point within the header.

EDIFACT documents that have achieved full standardization (Status 2) will be updated once a year (beginning in 1991) and are identified by a number of

the form yy.2, where yy is the last two digits of the year.

10. Implementation.

10.1 Schedule for Adoption. This FIPS PUB is effective September 30, 1991. After that date, Federal agencies that are not now using EDI for subject matter for which X12 or EDIFACT standards have been approved and issued shall utilize only those standards in EDI systems that they procure or develop. Agencies already using those standards shall continue to do so. Agencies using industry-specific standards for EDI on the effective date of this FIPS PUB shall be governed by Subsection 10.3.

10.2 Selection of X12 or EDIFACT. X12 and EDIFACT are separate, although similar, families of standards. The existence of one does not preclude the other. They can and, for the foreseeable future, must coexist. Efforts are being made, however, to align the standards as closely as possible, eventually providing for full compatibility between syntaxes and data dictionaries. For planning purposes, the Federal government recognizes the objective of the ASC X12 to align with UN/EDIFACT by 1994.

Until the completion of full alignment, Federal agencies may utilize either X12 or EDIFACT standards. In selecting a family of standards, agencies should attempt to maximize economy and efficiency to minimize the cost imposed on U.S. businesses. Consistent with these two criteria, agencies should use X12 standards for domestic interchanges, and X12 or EDIFACT standards for international interchanges. Agencies may employ both families of standards where required to meet the needs of trading partners and to be consistent with the two criteria.

10.3 Continued Use of EDI Industry Standards. Federal agencies using industry-specific EDI standards on the effective date of this FIPS PUB may continue to use those standards for five years. However, such agencies shall, without delay, submit their standardization requirements as indicated in Subsection 8.4.1. Industry-specific EDI standards may be used beyond five years only if no equivalent X12 or EDIFACT standards, as appropriate, have been approved and issued within four years of the effective date of this FIPS PUB. If an equivalent X12 or EDIFACT standard, as appropriate, is approved and issued after four years from the effective date of this FIPS PUB, Federal agencies using an industry-specific standard shall have one year to convert, following the issuance of the annual release containing the approved standard. An approved X12 or EDIFACT standard is defined in Subsection 10.4.

10.4 Version/Release Selection. Federal agencies shall employ those X12 standards fully approved by ASC X12 or those EDIFACT standards having achieved Status 2 (i.e., full approval by UN/ECE/WP.4), as published in the annual releases from the two standardizing organizations. Agencies, in their agreements with trading partners, may utilize any release that is less than four years old; that is, the most recent release and the three preceding yearly releases are implementable.

10.5 Security and Authentication. Agencies shall employ risk management techniques to determine the appropriate mix of security controls needed to protect specific data and systems. The selection of controls shall take into account procedures required under applicable laws and regulations.

Optional tools and techniques for implementation of security and authentication may be provided by ASC X12 and UN/ECE/WP.4 for use in connection with their respective families of standards. Agencies may utilize these tools and techniques, and/or they may utilize other methods in systems supporting the EDI data interchange. Methods and procedures implemented shall be consistent with applicable FIPS PUBS and guidance documents issued by NIST.

11. Waivers. Under certain exceptional circumstances, the heads of Federal departments and agencies may approve waivers to Federal Information Processing Standards (FIPS). The head of such agency may redelegate such authority only to a senior official designated pursuant to Section 3506(b) of title 44, U.S. Code.

Waivers shall be granted only when:

- a. Compliance with a standard would adversely affect the accomplishment of the mission of an operator of a Federal computer system, or
- b. Cause a major adverse financial impact on the operator which is not offset by government-wide savings.

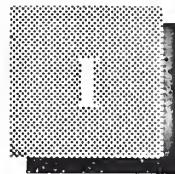
Agency heads may act upon a written waiver request containing the information detailed above. Agency heads may also act without a written waiver request when they determine that conditions for meeting the standard cannot be met. Agency heads may approve waivers only by a written decision which explains the basis on which the agency head made the required finding(s). A copy of each such decision, with procurement sensitive or classified portions clearly identified, shall be sent to: National Institute of Standards and Technology; Attn: FIPS Waiver Decisions, Technology Building, Room B-154; Gaithersburg, MD 20899.

In addition, notice of each waiver granted and each delegation of authority to approve waivers shall be sent promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published promptly in the *Federal Register*.

When the determination on a waiver applies to the procurement of equipment and/or services, a notice of the waiver determination must be published in the *Commerce Business Daily* as part of the notice of solicitation for offers of an acquisition or, if the waiver determination is made after that notice is published, by amendment to such notice.

A copy of the waiver, any supporting documents, the document approving the waiver and any supporting and accompanying documents, with such deletions as the agency is authorized and decides to make under 5 U.S.C. Sec. 552(b), shall be part of the procurement documentation and retained by the agency.

12. Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. When ordering, refer to Federal Information Processing Standards Publication 161 (FIPSPUB 161), and title. Payment may be made by check, money order, or NTIS deposit account.



Related INPUT Reports

A

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- *Procurement Analysis Reports, FY91-FY96*

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Industry Surveys

- *U.S. Information Services Industry, 1988*
- *Eighteenth Annual ADAPSO Survey of the Computer Services Industry*
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C

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- *Federal Professional Services Market, 1991-1996*
- *Federal Systems Integration Market, 1991-1996*
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EC/EDI Reports

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- *Vertical Industry EDI Directions and Potentials*
- *X.400 and EDI*
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Reports that focus on related areas are:

- *Software Productivity*
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